

# **INTENTIONAL FIRES**

**Ben Evarts**

**January 2012**



**National Fire Protection Association  
Fire Analysis and Research Division**

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## **Abstract**

During 2005-2009, an estimated 306,300 intentional fires were reported to U.S. fire departments per year, with associated annual losses of 440 civilian deaths, 1,360 civilian injuries, and \$1.3 billion in direct property damage. Three-quarters (75%) of these fires occurred outside, 18% occurred in structures and 8% in vehicles. In 2009, 19% of arson offenses were cleared by arrest or exceptional means.

The fire estimates are based on data from the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual fire department experience survey.

**Keywords:** fire statistics, fire setting, intentional fires, arson

## **Acknowledgements**

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

For more information about the National Fire Protection Association, visit [www.nfpa.org](http://www.nfpa.org) or call 617-770-3000. To learn more about the One-Stop Data Shop go to [www.nfpa.org/osds](http://www.nfpa.org/osds) or call 617-984-7443.

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## Executive Summary

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During 2005-2009, an estimated 306,300 intentional fires were reported to U.S. fire departments each year, with associated annual losses of 440 civilian deaths, 1,360 civilian injuries, and \$1.3 billion in direct property damage. Three-quarters (75%) of these fires occurred outside, 18% occurred in structures and 8% in vehicles.

Despite being only 18% of all intentional fires, structure fires accounted for 88% of civilian deaths, 82% of civilian injuries, and 81% of direct property damage caused by intentional fires. Sixty percent of intentional structure fires occurred in residential properties (55% in homes), 6% occurred in storage facilities, 6% occurred in educational properties, and 4% occurred in mercantile or business properties.

Nearly two-thirds (63%) of intentional structure fires occurred in structures that are occupied and operating, and these fires account for most of the associated losses. Thirteen percent occurred in vacant, unsecured properties, and 7% in vacant, secured properties.

The most common item first ignited in intentional structure fires was rubbish, trash or waste, but a disproportionate share of the property damage resulted from fires beginning with flammable or combustible liquids or gases, (possibly accelerants).

Intentionally set home structure fires were more likely to occur between 3:00 p.m. and midnight. The most common heat sources in intentional home fires were matches and lighters (each accounting for 26% of fires); the bedroom was the most common area of origin (13% of these fires). In educational properties, more than half (55%) of

intentionally set structure fires began in the bathroom. In storage properties, the garage was the most common area of origin (22% of fires), and in mercantile or business properties the most common area of origin was the bathroom (8% of fires).

Outside or unclassified fires accounted for 75% of intentionally set fires. In this report, outside trash or rubbish fires are often listed separately from other outside and unclassified fires. This is because outside trash and rubbish fires have limited reporting requirements. Among the outside or unclassified fires that were **not** trash or rubbish fires, one-third (33%) began in a lawn, field or other open area. Matches were the heat source in one-third (34%) of these fires, and a lighter was the heat source in 18%. Light vegetation, including grass, was the item first ignited in half (49%) of the fires.

In intentionally set vehicle fires, the most common items first ignited were vehicle seats (31%) and flammable and combustible liquids and gases, piping or filter (28%). Matches were the most common heat source (28% of fires), lighters were the heat source in 14%, and an incendiary device in 13%.

Additional resources, including a free downloadable presentation on preventing arson can be found at [www.nfpa.org/arson](http://www.nfpa.org/arson).



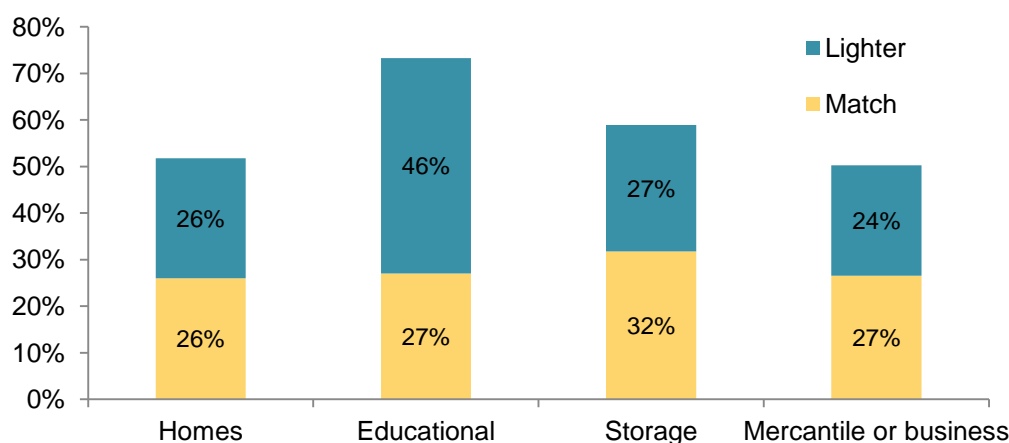


## Intentional Fires Fact Sheet

During 2005-2009, an estimated 306,300 intentional fires were reported to U.S. fire departments each year, with associated annual losses of 440 civilian deaths, 1,360 civilian injuries, and \$1.3 billion in direct property damage: These fires included:

- 229,200 outside or unclassified fires
- 53,700 structure fires
- 23,400 vehicle fires

### Percent of Intentional Structure Fires Started by Matches or Lighters 2005-2009 By Property Use



- Despite being only 18% of all intentional fires, intentional structure fires account for 88% of civilian deaths
- Intentionally set home structure fires are more likely to be set in the afternoon and evening hours, between 3 p.m. and midnight
- Three-fifths (61%) of outside or unclassified intentional fires began with a match or lighter

### IDENTIFYING INTENTIONAL FIRES

#### What is an “intentional” fire?

The fire statistics in this analyses use detailed data from the U.S. Fire Administration’s National Fire Incident Reporting Systems (NFIRS). The definition of “intentional” in NFIRS 5.0 specifically includes “deliberate misuse of heat source or a fire of an incendiary nature.”

Additional resources, including a free downloadable presentation on preventing arson can be found at [www.nfpa.org/arson](http://www.nfpa.org/arson)

# NFPA's Fire Safety Resources

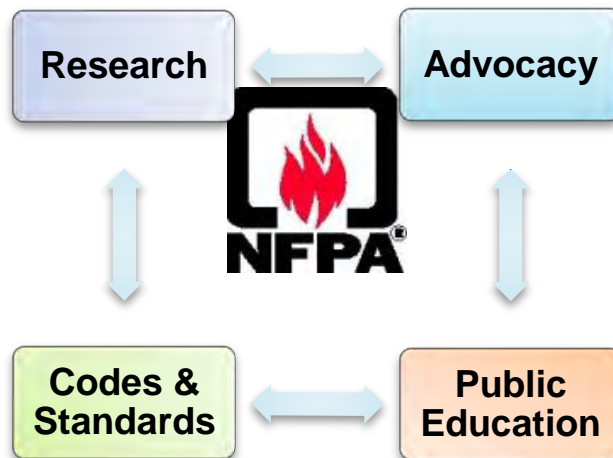
NFPA's wealth of fire-related research includes investigations of technically significant fire incidents, fire data analysis, and the Charles S. Morgan Technical Library, one of the most comprehensive fire literature collections in the world. In addition, NFPA's Fire Protection Research Foundation is a source of independent fire test data. Find out more at:

[www.nfpa.org/research](http://www.nfpa.org/research)

Properly installed and maintained smoke alarms are necessary to provide a warning of any fire to all occupants. You can find out more information about smoke alarms here: [NFPA Smoke Alarm Information](#)

Home fire sprinkler systems provide even greater protection. These systems respond quickly to reduce the heat, flames, and smoke from a fire until help arrives. More information about home fire sprinklers may be found at [www.firesprinklerinitiative.org](http://www.firesprinklerinitiative.org)

Simply put, smoke alarms and fire sprinklers save lives.



NFPA also develops, publishes, and disseminates more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks. Fire and explosion investigations begin with:

[NFPA 921: Guide for Fire and Explosion Investigations](#):

[For consumers](#): NFPA has consumer safety information regarding causes, escape planning, fire & safety equipment, and many other topics.

[For kids](#): Sparky.org has important information for kids delivered via fun games, activities, and cartoons.

[For public educators](#): Resources on fire safety education programs, educational messaging, grants & awards, and many other topics.

## Overview: Intentional Fires

### More than 300,000 intentionally set fires per year were reported to local fire departments in the U.S. between 2005 and 2009.

During 2005-2009, an estimated 306,300 intentional fires were reported to U.S. fire departments each year, with associated annual losses of 440 civilian deaths, 1,360 civilian injuries, and \$1.3 billion in direct property damage. Three-quarters (75%) of these fires occurred outside, 18% occurred in structures and 8% in vehicles. The majority of losses resulted from structure fires. (See Table A below)

**Table A.**  
**Intentional Fires, by Incident Type: 2005-2009 Annual Averages**

Incident Type	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Outside or unclassified fires	229,200	(75%)	20	(4%)	170	(12%)	\$61	(5%)
Outside trash or rubbish fires	133,300	(44%)	0	(0%)	40	(3%)	\$5	(0%)
Outside or unclassified fires (excluding trash or rubbish fires)	95,900	(31%)	10	(3%)	130	(10%)	\$57	(4%)
Structure fires	53,700	(18%)	390	(88%)	1,120	(82%)	\$1,068	(81%)
Vehicle fires	23,400	(8%)	30	(8%)	70	(5%)	\$192	(15%)
Total	306,300	(100%)	440	(100%)	1,360	(100%)	\$1,321	(100%)

Intentional structure fires occurred in a wide variety of property types. Three-fifths (60%) of the structure fires, 95% of the civilian fatalities, and 87% of the civilian injuries, occurred in residential properties. Outside and special properties (like bridges and vacant lots), educational, and storage properties were also common occupancies for these fires, as shown in Table B below.

**Table B.**  
**Intentional Structure Fires, by Property Use: 2005-2009 Annual Averages**

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Residential	32,300	(60%)	370	(95%)	980	(87%)	\$729	(68%)
Outside or special property	9,300	(17%)	0	(0%)	10	(1%)	\$11	(1%)
Storage	3,200	(6%)	10	(2%)	20	(2%)	\$41	(4%)
Educational	3,000	(6%)	0	(0%)	20	(2%)	\$58	(5%)
Mercantile or business	2,100	(4%)	0	(1%)	30	(3%)	\$104	(10%)
Assembly	2,100	(4%)	0	(1%)	10	(1%)	\$64	(6%)
Other known property use	1,700	(3%)	0	(1%)	50	(4%)	\$60	(6%)
Total	53,700	(100%)	390	(100%)	1,120	(100%)	\$1,068	(100%)

## **IDENTIFYING INTENTIONAL FIRES**

### **What is an “intentional” fire?**

The fire statistics in this analyses use detailed data from the U.S. Fire Administration’s National Fire Incident Reporting Systems (NFIRS). The definition of “intentional” in NFIRS 5.0 specifically includes “deliberate misuse of heat source or a fire of an incendiary nature.”

### **What is “arson”?**

The Uniform Crime Reporting Program defines arson as “any willful or malicious burning or attempt to burn, with or without intent to defraud, a dwelling house, public building, motor vehicle or aircraft, personal property of another, etc.” Here, “willful” is essentially the same as “intentional,” and the rest of the definition consists of examples of types of harm that are included.

### **What is the difference between “intentional” and “arson”?**

Both terms refer to a fire that was started deliberately. For “intentional,” that is the whole of the definition. For “arson,” there are two other elements: (a) to some extent, the firesetter intended not only the fire but the harm caused by the fire, and (b) by applicable legal standards, the firesetter was capable of forming a criminal intent. In many jurisdictions, for example, there is a minimum age below which an individual cannot be charged with arson. In some jurisdictions, a person can legally destroy his or her own property, including a house. “Incendiary” has many definitions, but the usage of the term in fire investigation usually contains both the intent to start the fire and at least some intent to cause harm.

### **What data sources are used in this report?**

Several data sources are used in this analysis. National estimates for this analysis are derived from the National Fire Incident Reporting Systems (NFIRS) and the NFPA’s annual fire department experience survey. In NFIRS Version 5.0, intentional fires are identified by cause of ignition code 1. Only fires reported to municipal fire departments are included in these statistics. Details on the methodology used may be found in Appendix A.

“Intentional” is a code entry unique to NFIRS Version 5.0. Prior to 1999, the field ignition factor included a choice between “incendiary,” “suspicious,” “child playing,” and many other fire causes. This is important to keep in mind when looking at trend analysis. More information on the coding history is in Appendix B.

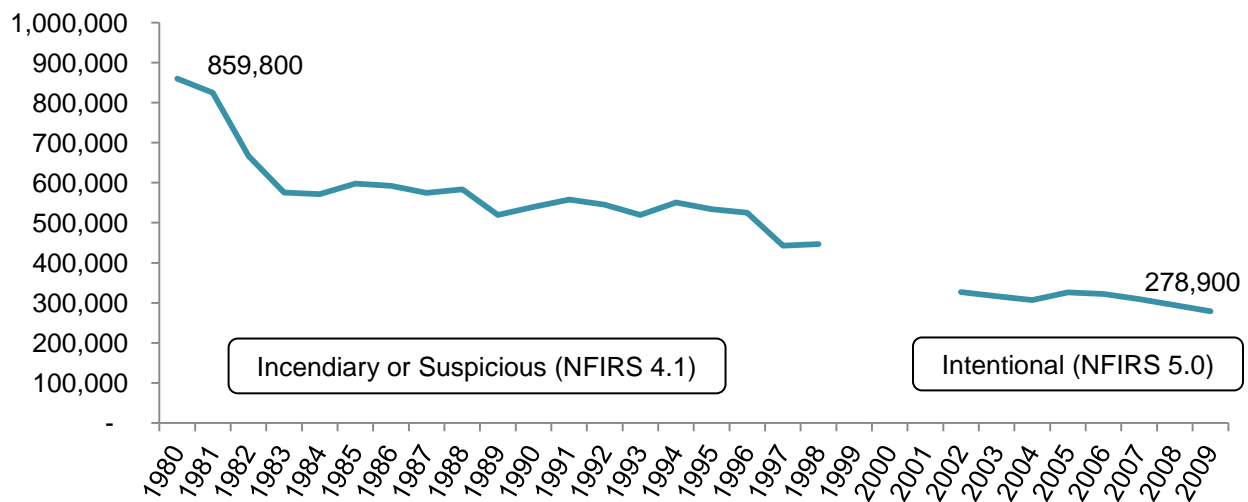
NFIRS Version 5.0 has six categories of confined structure fires, including cooking fires confined to the cooking vessel, confined chimney or flue fires, confined incinerator fire, confined fuel burner or boiler fire or delayed ignition, confined commercial compactor fire, and trash or rubbish fires in a structure with no flame damage to the structure or its contents. Although causal information is not required for these incidents, it is provided in some cases. Confined fires are analyzed separately from non-confined fires; estimates are based on the share with causal data. Causal data is not required but is sometimes provided for outside trash fires. The same analysis approach is used for outside trash and non-trash as was used for non-confined and confined structure fires.

Another source of arson estimates used in this report is the Federal Bureau of Investigation’s Uniform Crime Reports. This source does not take into account gaps in reporting in its published numbers of arson crimes. but does in estimating arson offense rates relative to population.

### **Intentionally set fires have remained relatively level since 2000.**

Overall, intentional fires have declined 68% from a high of 859,800 in 1980. This is an across the board decline across different types of fires, as structure fires have decreased 75%, vehicle fires by 73%, and outside and unclassified fires by 64%. Part of this decline occurred due to the switch over from NFIRS 4.1 to NFIRS 5.0 in 1999. In the new system “suspicious” was removed as a coding option, and thus these fires may no longer be reflected in estimates of intentional fires. See Table 1 and Figure 1 below.

**Figure 1.  
Intentional Fires, by Year  
1980-2009**



### **In half of all fires reported to NFIRS that have the arson module filled out, the investigation is coded as being open.**

The arson module is optional in NFIRS, and it can be filled out when the cause of ignition is intentional, or cause under investigation. It may also be used when the fire is coded as “cause undetermined after investigation”, and to document juvenile-set fires. In half (48%) of these incidents, the case status is coded as “Investigation open”. Note that this definition gives a wide berth, and not every incident for which the arson module is completed is necessarily “arson” in the traditional criminal definition. The investigation is closed in 39% of cases, inactive in 6%, closed with an arrest in 4%, and closed with exceptional clearance in 2%. (See Table 2)

### **Most intentional fires are set on private property.**

Nearly 9 out of 10 (88%) intentionally set fires occur on privately owned property (based on incidents where the NFIRS arson module was filled out). Six percent began on property owned by a city or town. (See Table 3)

### **One-quarter of intentional fires where a motivation is suspected are motivated by curiosity.**

Based on fires where the arson module of NFIRS 5.0 was filled out, most incidents of arson (63%) are not suspected to be motivated by gain or curiosity. One-quarter of intentional fires are motivated by curiosity, and 22% by gain. Table C below shows that these patterns differ by investigation status.

**Table C.**  
**Intentional Fires, by Investigation Status and Suspected Motive:**  
**2005-2009 Annual Averages**

Investigation Status	Unclassified Motivation	Gain-Related Motivation	Curiosity or Fireplay	Suspected Motivation Other than Gain or Curiosity	Total*
Investigation open	11%	30%	16%	70%	127%
Investigation closed	18%	10%	43%	41%	111%
Investigation inactive	9%	26%	26%	58%	119%
Investigation closed with arrest	10%	13%	23%	82%	127%
Closed with exceptional clearance	8%	8%	56%	42%	115%
All fires with completed arson module	13%	22%	25%	63%	123%

\*Note: multiple motives are allowed

Source: NFIRS 5.0

**Curiosity is more likely to be a suspected motivation in intentional fires that have been closed with exceptional clearance, or closed in general.**

Overall, 25% of intentional fires are suspected to have been motivated by curiosity, however this is much more likely to be the case (56% of incidents) when the investigation has been closed by exceptional clearance (an exceptional clearance is made when an investigation has established an offender, there is enough information to support an arrest charge, and the location of the offender is known, but there is a reason outside police control that prevents arresting, charging and prosecuting the offender<sup>1</sup>). One example of this is a juvenile offender. Suspected gain motivations are more common when an investigation is open or inactive (30% and 26% respectively) than when it has been closed with an arrest (13%). Additional information about arson (from a criminal justice perspective) can be found in Section 4.

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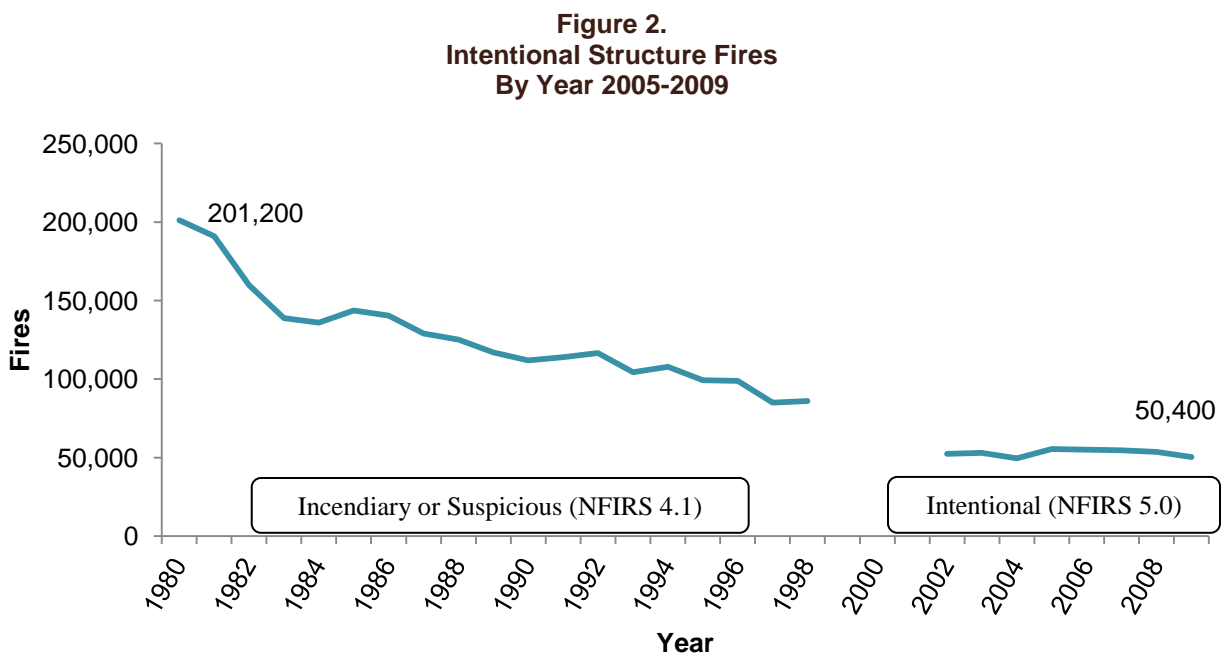
<sup>1</sup> "MI State Police - Uniform Crime Report - Glossary." *Michigan State Police*, 1997. 29 Nov 2011.  
 <[http://www.state.mi.us/msp/cjic/ucr/ucr\\_m.htm](http://www.state.mi.us/msp/cjic/ucr/ucr_m.htm)>

## Section 1: Intentional Structure Fires

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**Between 2005 and 2009, 53,700 intentional structure fires were reported to local fire departments each year.**

These fires caused 390 deaths, 1,120 injuries, and \$1.1 billion in property damage annually. In 2009, there were an estimated 50,400 intentionally set structure fires, which is the lowest since 1980, when data collection using the current methodology began. As Figure 2 below shows, these fires fell from 1980 until 1999, and have remained relatively stable since. Part of the drop in fires after 1998 may be due to changes in NFIRS.



**Most intentionally set structure fires occur in a structure that is occupied and operating.**

Sixty three percent of intentional structure fires occurred in properties that were occupied and operating, as did 95% of the associated civilian deaths, 94% of civilian injuries, and 62% of property damage. Thirteen percent of these fires occurred in vacant and unsecured properties. Vacant and secured properties accounted for 7% of intentional structure fires. (See Table 4)

**Most intentional structure fires and associated losses occurred in residential properties.**

Three-fifths (60%) of these fires occurred in residential properties (55% in one- or two-family homes or apartments). Fires in residential properties also account for 95% of associated civilian deaths, 87% of civilian injuries, and 68% of property damage caused by intentional structure fires. Seventeen percent of intentional structure fires occur in outside or special properties, 6% in storage, and 6% in educational properties. Four percent of intentional structure fires occur in mercantile or business properties, but these fires cause 10% of the associated property damage. (See Table B on page 1).



**Area of origin in intentional fires varies by occupancy type.**

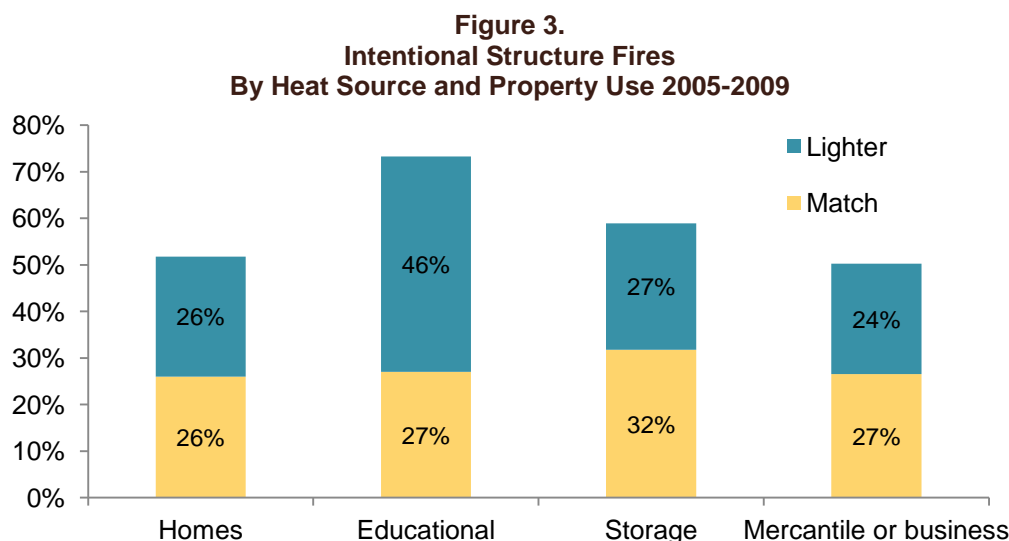
Intentional fires in homes are most likely to start in the bedroom (13%), and these fires cause 26% of the civilian deaths in intentional home fires. Fires in educational, and mercantile or business properties are most likely to start in a bathroom (55% and 8% respectively). In storage properties, intentional fires are most likely to be set in a garage (22% of fires). (See Table 5)

**Rubbish, trash, or waste is the most common item first ignited in intentionally set fires in all analyzed property types.**

Educational properties had the highest proportion of fires that began with rubbish, trash, or waste, (38% of fires). Mercantile or business, and storage properties each had 19% of their intentional fires begin with trash, and 13% of intentional structure fires in homes began with rubbish, trash, or waste as well. Property damage tended to be higher in fires beginning with flammable or combustible liquids or gases, piping or filter (possibly accelerants). (See Table 6)

**Matches or lighters were the heat source in at least half of the intentionally set fires in each property type analyzed.**

Figure 3 below shows that educational properties had the highest proportion of lighters (46%) and lighters and matches combined (73%). Fifty-nine percent of intentional fires in storage properties were started by either a lighter or a match. In mercantile or business properties, 8% of intentional fires were set with some sort of incendiary device, and these fires caused 18% of the property damage. (See Table 7)



**Intentional structure fires are slightly more common on weekends in homes and storage properties, but more common on weekdays in educational properties.**

Table 8 shows that these fires are slightly more common on the weekends than on weekdays in homes and storage properties. Only 10% of intentional structure fires in educational properties occur on weekends (if they were evenly distributed, they would account for 29% of fires) because these properties are less likely to be occupied on these days. In mercantile and business properties, these fires are spaced evenly across the days of the week.

**In educational properties, intentional fires are less common during the summer months.**

Table 9 shows that intentionally set fires are more common during the school year in educational properties, and more common from April through July in storage properties. There are no major differences in fires by month in the other property types.

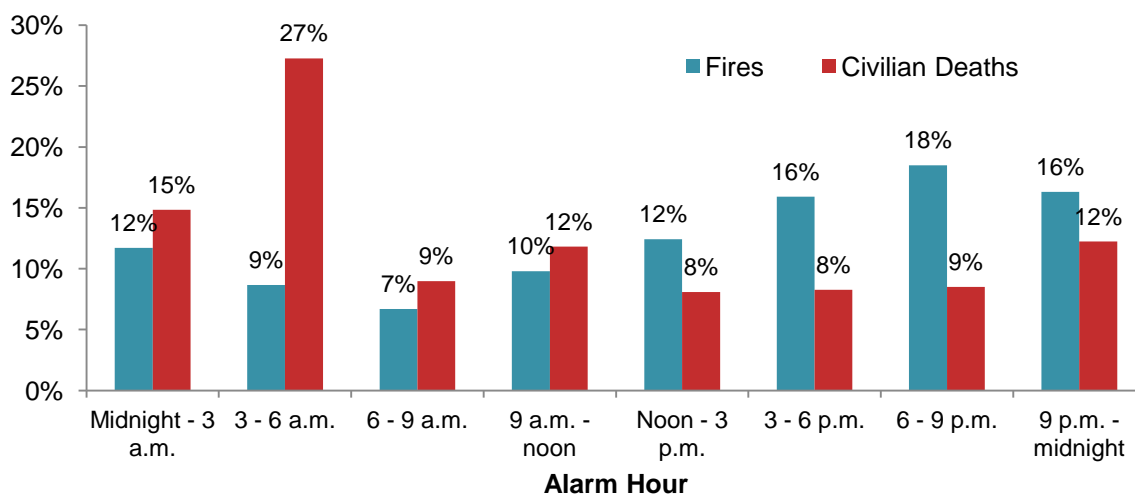
**Intentional structure fires are more common in the evening or nighttime hours in all analyzed property uses except for educational occupancies.**

In educational properties, 35% of intentionally set structure fires occur between noon and 3:00 p.m. In mercantile and business properties, 31% of these fires occur between 9:00 p.m. and 3:00 a.m. In storage properties, these fires peak from 3:00 to 9:00 p.m. (See Table 10)

**Intentional *home* fires are more common during the evening hours, but deaths are more common late at night or early in the morning.**

Table 10 and Figure 4 below show that intentional home structure fires peak between 6:00 and 9:00 p.m. However, fires that occur during the late night/early morning hours cause more civilian deaths.

**Figure 4.**  
**Intentional Home Structure Fires**  
**By Time of Day 2005-2009**



## Section 2: Intentional Outside or Unclassified Fires

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**An average of 229,200 outside and unclassified fires per year between 2005 and 2009 were set intentionally.**

Outside and unclassified fires account for 75% of intentionally set fires, 4% of associated civilian deaths, 12% of civilian injuries, and 5% of direct property damage. In this report, outside trash or rubbish fires are often listed separately from other outside and unclassified fires. This is because outside trash and rubbish fires have limited reporting requirements. Among intentional outside or unclassified fires, 58% were coded as trash or rubbish fires.

**The most common areas of origin for intentionally set outside fires are an unclassified area and a lawn, field, or open area.**

One-third (32%) of these fires begin in an unclassified outside area, and 30% begin in a lawn, field, or open area. Trash or rubbish fires are more likely to begin on or near a highway, public way, or street than other kinds of outside or unclassified fires (13% vs. 6%). Non-trash outside fires are more likely to begin in a vegetation or wildland or woods area than outside trash or rubbish fires. (See Table 11)

**Matches and lighters are the heat source in three-fifths (61%) of intentionally set outside or unclassified fires.**

Two-fifths (41%) of intentional outside fires begin with a match, and one-fifth (20%) begin with a lighter. Eleven percent of these fires began with an unclassified heat source, and 6% begin with a flame or torch used for lighting. Fireworks are more common in non-trash outside or unclassified fires (5% vs. 1%). (See Table 12)

**Light vegetation, including grass, was the leading item first ignited in intentionally set non-trash outside fires, and, unsurprisingly, rubbish, trash or waste was the leading item first ignited in outside trash or rubbish fires.**

Overall, light vegetation, including grass was the item first ignited in 28% of outside and unclassified fires, and rubbish, trash, or waste was the item first ignited in 25% of fires. When only looking at intentionally set outside trash or rubbish fires, rubbish trash or waste was the item first ignited 40% of the time, and light vegetation 13% of the time. In all other (non-trash) outside or unclassified fires, light vegetation was the item first ignited 49% of the time, and rubbish, trash or waste 5%. (See Table 13)

**Intentionally set outside and unclassified fires are slightly more common on weekends than weekdays, and during the afternoon and evening hours.**

Table 14 shows that there is a slight increase in these fires on weekends vs. weekdays. Table 15 shows that these fires peak between 3:00 p.m. and 9:00 p.m. Forty-four percent of these fires occur during this time period, if all fires were distributed evenly, only 25% of fires would.

**Outside trash and rubbish fires are spread evenly through the year, but non-trash outside or unclassified fires show spikes in March, April, and July.**

Table 16 shows that outside or unclassified fires overall show increases in July, April, and March. This is almost exclusively due to differences in intentionally set non-trash outside or unclassified fires during these months. The spike in July is likely due to the prevalence of fireworks around the July 4<sup>th</sup> holiday.

### Section 3: Intentional Vehicle Fires

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**Between 2005 and 2009, an average of 23,400 intentionally set vehicle fires were reported to local fire departments in the U.S. each year.**

These fires were responsible for annual averages of 35 civilian deaths, 70 civilian injuries and \$192 million in direct property damage. Intentional vehicle fires accounted for 8% of all intentional fires, 8% of associated civilian deaths, 5% of civilian injuries and 15% of direct property damage.

**Matches are the most common heat source in intentional vehicle fires.**

Twenty-eight percent of intentional vehicle fires began with a match, and 14% began with a lighter. Thirteen percent began with some sort of incendiary device. The 2% of intentional vehicle fires that began with fireworks caused 11% of the property damage. (See Table 17)

**The two most common items first ignited in intentional vehicle fires are a vehicle seat, and a flammable or combustible liquid or gas, piping or filter.**

Table 18 shows that 31% of these fires began when a vehicle seat was ignited, and 28% began when a flammable or combustible liquid or gas, piping or filter was ignited. The cases where a flammable liquid or gas was first ignited caused 58% of the civilian injuries and 71% of the civilian deaths.

**Half of intentional vehicle fires begin in the passenger area of the vehicle.**

Fifty-two percent of intentional vehicle fires begin in the passenger area, and 13% begin in an unclassified vehicle area. One in ten (10%) begin in the engine area, running gear, or wheel area of a vehicle, and 8% begin on the exterior. (See Table 19.)

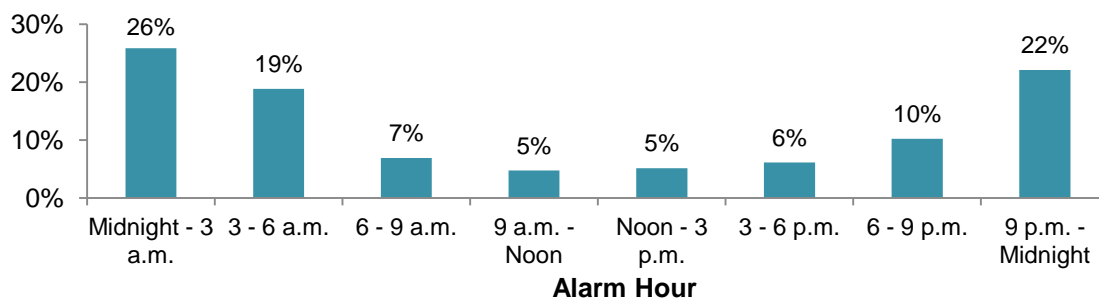
**These fires are more likely on the weekend and between the months of May and August.**

Table 20 shows that 18% of intentional vehicle fires occur on Sunday and 16% occur on Saturday (compared to a daily average of 14%). These fires also show a slight increase during the warmer months, peaking in July (10% of fires). (See Table 21.)

**Intentional vehicle fires are more likely to be set late at night and early in the morning.**

Table 22 and Figure 5 below show that intentionally set vehicle fires peak between midnight and 3:00 a.m. and are at their lowest level during the daytime (between 9:00 a.m. and 3:00 p.m.).

**Figure 5. Intentional Vehicle Fires: By Time of Day 2005-2009**



## Section 4: Firesetters and Criminal Justice

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### **In the U.S., nearly one of every five arson offenses (19% in 2009) is cleared by arrest or “exceptional means.”**

“Clearance” means the law enforcement officials are satisfied that they have identified the perpetrator, even if no arrest has been made for that particular offense. (It is not unusual for an individual who is suspected of many offenses to be charged with only a few of them for which the evidence is the strongest. The officials will regard all the offenses as cleared.) A single clearance can mean several arrests if a fire was set by several persons. A single arrest can mean several clearances if one suspect is reliably associated with several arson offenses. From 2008 to 2009, there was an 11% drop in arson offenses according to FBI statistics. In 2009, according to the FBI, 44% of arson offenses involved structures<sup>2</sup>.

Clearance by “exceptional means” involves the following criteria: (1) identification of offender, (2) sufficient evidence to support an arrest, make a charge, and turn over the offender for prosecution, (3) identification of the offender’s exact location so that an arrest can be made, and (4) circumstances outside the control of law enforcement that prohibit arrest, such as death of the offender, denial of extradition because of simultaneous prosecution for another offense elsewhere, or refusal of victim to cooperate with prosecution after identifying the offender.

Table 23 indicates that the regional clearance percentages have also been fairly stable, except for a sustained improvement in the Northeast, which had the highest clearance rate in 2001 to 2009. The South had had the highest clearance rate in every year prior to 2001 and now ranks second, behind the Northeast.

In 2009, 19% of arson offenses were cleared by arrest or “exceptional means” and in 35% of clearances only juveniles were involved. According to the Bureau of Justice Statistics, 46% of arson suspects in arson cases that took place between October 2003 and September 2004 were prosecuted. Of the cases that commenced during the same time period, 55% of defendants were released.<sup>3</sup>

### **Juveniles have accounted for slightly less than half of arson arrestees in 2009.**

Table 24 shows the 2009 age breakdown of arrestees, when 44% of arrestees were under age 18. Table 24 also shows more than half (55%) of arrestees are under age 21.

### **The percentage of arson arrestees under age 10 (2% in 2009) is much higher than for any other crime the FBI tracks.**

Table 24 shows that 2% of people arrested for arson were under 10 years of age. Interestingly, the percentage under age 10 was higher in the 1980s, when the total percentage of arrestees under age 18 was lower than it has been in recent years. (See Table 25)

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<sup>2</sup> Crime in the United States 2009, Federal Bureau of Investigation, Table 15  
[http://www2.fbi.gov/ucr/cius2009/data/table\\_15.html](http://www2.fbi.gov/ucr/cius2009/data/table_15.html)

<sup>3</sup> Bureau of Justice Statistics, *Compendium of Federal Justice Statistics*, 2004, December 2006.

**Small towns have smaller intentional structure fire rates relative to population than the largest cities and rural communities.**

Rates of intentional structure fires or arson offenses, relative to population, are highest in large cities but also tend to be higher in rural communities (under 2,500 population) than in small towns (say, 2,500 to 24,999 population). Table 26 makes this point, while also showing that the differences by size of community vary from year to year and from measure to measure.

**There is some diversity of opinion as to how to describe different types of youthful firesetters.**

As our understanding has grown regarding the many different circumstances that can lead to firestarting by children, there has also been a growing discomfort with the rigidity of the two traditional choices – “intentional” (formerly incendiary), with its close association with arson or other acts intended to cause harm to people or property, and “playing,” with its implications of both innocence and recklessness.

In NFIRS 5.0, it is now possible to code a fire as intentional or playing (not limited to children) or both, to indicate age of the firestarter was a factor or not, and to indicate the age of the firestarter if age was cited as a factor. This could permit the reckless fireplay of older youths to be distinguished from traditional curiosity firestarting by young children. The former could be coded as intentional and playing, the latter could be coded as unintentional and playing, and both could be coded with age as a factor.

However, it is not clear what should be done about so-called “crisis” firesetters – children whose firesetting behavior is a cry for help but may or may not represent a deliberate, intentional choice, this behavior does not fit well with either intentional or playing. Juvenile firesetters have diverse motives, including curiosity fireplay, anger and cries for help, fire as a form of juvenile delinquency, and severe emotional disturbance.

In 2005-2009, fires reported as either intentional or playing divided as follows:<sup>4</sup>

- 13% both intentional and playing
  - Of these fires the ones coded as age of involved person was a factor showed 46% with involved person under age 10, 99% with involved person under age 18, 10% with involved person under age 5, and 0% with involved person age 65 or over;
- 8% playing but not intentional
  - Of these fires the ones coded as age of involved person was a factor showed 58% with involved person under age 10, 99% with involved person under age 18, 19% with involved person under age 5, and 0% with involved person age 65 or over;
- 79% intentional but not playing
  - Of these fires the ones coded as age of involved person was a factor showed 23% with involved person under age 10, 84% with involved person under age 18, 5% with involved person under age 5, and 7% with involved person age 65 or over.

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<sup>4</sup> Ben Evarts, *Children Playing with Fire*, NFPA Fire Analysis and Research Division, December 2011

With these figures, one can develop some tentative conclusions regarding the relationship between age, playing with fire, and intentional fire-setting:

- Two-thirds of playing fires are also coded as intentional. However, only one-quarter of intentional fires are also coded as playing. The overlap is large from the perspective of playing fires but much smaller from the perspective of intentional fires.
- The fire service and development psychology experts use different thresholds for when a child is capable of forming an intention, with awareness of the likely consequences of the intended act. Fully 5% of the people (where age was a factor) involved in an intentional, non-playing fire were under age 5. This would seem to suggest that there is no real minimum age for setting a fire with intention or that the intention cited in fire incident reports is not the same as legal intention.
- The statistics show little or no evidence of playing being reported for fires involving reckless horseplay by young adults or involving senile dementia in older adults. It is possible that the former are not considered examples of age being a factor and the latter are not considered examples of playing.
- There is evidence that age is coded as a factor for children and older adults only. There is no way to tell what fraction of fires overall involve children or older adults or to tell what fraction of total fires involving children or older adults are being coded as age was a factor. Most fires are not coded as age was a factor.
- More information about juvenile fire setting can be found in NFPA's report [Children Playing With Fire](#)

**Table 1.**  
**Intentional Fires, by Incident Type and Year**

<b>A. Fires</b>					
<b>Year</b>	<b>Structure</b>		<b>Vehicle</b>	<b>Outside or Unclassified</b>	<b>Total Fires</b>
1980	201,200		74,800	583,800	859,800
1981	190,900		65,500	568,200	824,600
1982	159,800		56,000	450,900	666,700
1983	138,800		55,300	381,100	575,200
1984	136,000		64,500	370,500	571,100
1985	143,600		72,900	381,000	597,500
1986	140,500		78,600	373,500	592,600
1987	129,100		76,500	368,900	574,500
1988	125,100		72,500	385,800	583,400
1989	117,000		70,000	332,600	519,600
1990	111,900		76,200	351,400	539,500
1991	113,900		76,800	367,400	558,100
1992	116,600		73,500	355,100	545,200
1993	104,400		68,200	347,200	519,800
1994	107,900		66,600	376,500	551,000
1995	99,300		66,300	368,300	533,900
1996	98,800		74,400	351,500	524,800
1997	85,000		64,500	293,300	442,800
1998	86,000		66,300	294,900	447,200
1999	61,800	(43,900)	29,300	252,400	343,400
2000	54,600	(39,900)	25,900	229,000	309,600
2001	48,500	(33,800)	24,100	254,500	327,100
2002	52,300	(33,100)	28,900	246,000	327,100
2003	53,000	(28,500)	24,800	238,500	316,400
2004	49,600	(29,200)	23,000	234,400	307,000
2005	55,500	(29,100)	25,800	244,500	325,900
2006	55,100	(29,100)	24,100	243,300	322,500
2007	54,700	(30,400)	24,200	230,200	309,100
2008	53,600	(29,400)	22,500	218,000	294,200
2009	50,400	(26,500)	20,300	208,200	278,900

Source: NFIRS and NFPA survey. Estimates for 1999-2009 are based on data collected originally in NFIRS 5.0 only. Due to the smaller share of NFIRS data collected in 1999-2001, statistics for these years should be viewed with caution. Numbers in parentheses exclude fires reported as a “confined fire” incident type.



**Table 1.**  
**Intentional Fires, by Incident Type and Year**

**B. Civilian Deaths**

<b>Year</b>	<b>Structure</b>	<b>Vehicle</b>	<b>Outside or Unclassified</b>	<b>Total Civilian Deaths</b>	<b>Firefighters Fatally Injured at Scene or During Response</b>
1980	930	30	20	980	24
1981	810	20	20	850	21
1982	930	30	10	970	20
1983	860	190	10	1,070	16
1984	660	30	20	710	15
1985	720	40	30	800	29
1986	800	40	10	850	24
1987	730	60	30	820	27
1988	870	40	10	930	25
1989	840	50	10	910	16
1990	810	30	10	850	15
1991	690	30	10	740	17
1992	720	30	10	760	13
1993	840	40	10	890	9
1994	500	50	10	560	14
1995	740	70	10	820	13
1996	680	60	10	760	5
1997	660	40	10	710	6
1998	640	40	10	680	10
1999	380	(380)	0	380	8
2000	390	(390)	40	430	9
2001	370	(370)	10	390	5
2002	330	(330)	90	420	12
2003	440	(440)	50	520	5
2004	310	(310)	30	350	3
2005	430	(430)	40	490	3
2006	330	(330)	40	380	10
2007	420	(420)	40	480	3
2008	400	(400)	10	430	4
2009	350	(350)	40	400	6

**Incendiary or Suspicious**

**Intentional**

Source: NFIRS and NFPA survey. Estimates for 1999-2009 are based on data collected originally in NFIRS 5.0 only. Due to the smaller share of NFIRS data collected in 1999-2001, statistics for these years should be viewed with caution. Numbers in parentheses exclude fires reported as a “confined fire” incident type.

**Table 1.**  
**Intentional Fires, by Incident Type and Year**

<b>C. Civilian Injuries</b>						
<b>Year</b>	<b>Structure</b>	<b>Vehicle</b>	<b>Outside or Unclassified</b>	<b>Total Civilian Injuries</b>	<b>Firefighters Injured on Scene at Intentional Fire</b>	
1980	3,010	180	150	3,340	-	<b>Incendiary or Suspicious</b>
1981	3,790	190	170	4,150	-	
1982	3,420	100	120	3,640	-	
1983	3,160	130	120	3,410	-	
1984	2,640	120	170	2,930	-	
1985	2,840	140	140	3,120	11,300	
1986	2,930	170	110	3,200	10,600	
1987	2,700	180	130	3,010	8,300	
1988	3,140	140	140	3,420	9,900	
1989	2,990	150	110	3,250	9,600	
1990	3,190	170	110	3,480	10,500	<b>Intentional</b>
1991	3,390	130	170	3,700	10,800	
1992	3,170	160	170	3,500	10,200	
1993	3,330	100	150	3,580	8,900	
1994	3,070	160	220	3,450	9,300	
1995	2,550	130	180	2,860	7,900	
1996	2,650	110	160	2,920	6,500	
1997	2,090	120	120	2,330	6,100	
1998	2,320	160	220	2,700	5,600	
1999	2,030 (2,030)	110	210	2,340	8,700	
2000	1,290 (1,200)	40	190	1,520	6,600	
2001	1,630 (1,630)	110	190	1,930	4,500	
2002	1,390 (1,320)	50	170	1,610	5,200	<b>Intentional</b>
2003	1,190 (1,110)	80	230	1,500	5,300	
2004	1,090 (1,060)	70	260	1,420	6,300	
2005	1,200 (1,140)	90	220	1,510	7,600	
2006	980 (940)	50	170	1,200	7,700	
2007	1,240 (1,210)	70	130	1,450	6,100	
2008	1,080 (1,030)	70	160	1,310	5,600	
2009	1,080 (1,030)	80	160	1,310	5,800	

Source: NFIRS and NFPA survey. Estimates for 1999-2009 are based on data collected originally in NFIRS 5.0 only. Due to the smaller share of NFIRS data collected in 1999-2001, statistics for these years should be viewed with caution. Numbers in parentheses exclude fires reported as a “confined fire” incident type.

**Table 1.**  
**Intentional Fires, by Incident Type and Year**

**D. Direct Property Damage (in millions)**

Year	Structure		Vehicle	Outside or Unclassified	Direct Property Damage	Total in 2009 Dollars
1980	\$1,776		\$143	\$19	\$1,938	\$5,053
1981	\$1,994		\$108	\$32	\$2,135	\$5,031
1982	\$1,918		\$115	\$21	\$2,054	\$4,562
1983	\$1,675		\$166	\$14	\$1,854	\$3,990
1984	\$1,549		\$176	\$13	\$1,738	\$3,584
1985	\$1,920		\$142	\$22	\$2,084	\$4,150
1986	\$1,786		\$179	\$17	\$1,983	\$3,885
1987	\$1,803		\$185	\$14	\$2,002	\$3,781
1988	\$1,878		\$215	\$21	\$2,114	\$3,838
1989	\$1,584		\$222	\$32	\$1,838	\$3,183
1990	\$1,763		\$244	\$37	\$2,044	\$3,360
1991*	\$2,167		\$268	\$9	\$2,444	\$3,850
1992*	\$2,133		\$235	\$63	\$2,431	\$3,720
1993*	\$1,667		\$207	\$13	\$1,886	\$2,801
1994	\$1,756		\$238	\$33	\$2,027	\$2,936
1995	\$2,145		\$267	\$26	\$2,438	\$3,432
1996	\$1,802		\$263	\$29	\$2,094	\$2,867
1997	\$1,405		\$293	\$16	\$1,758	\$2,350
1998	\$1,467		\$324	\$86	\$1,877	\$2,473
1980	\$1,776		\$143	\$19	\$1,938	\$5,053
1999*	\$991	(\$991)	\$169	\$14	\$1,174	\$1,512
2000	\$1,118	(\$1,116)	\$124	\$170	\$1,412	\$1,760
2001*	\$836	(\$831)	\$90	\$13	\$939	\$1,139
2002	\$908	(\$906)	\$161	\$6	\$1,074	\$1,282
2003	\$860	(\$857)	\$142	\$27	\$1,029	\$1,202
2004	\$818	(\$817)	\$128	\$41	\$986	\$1,122
2005	\$915	(\$911)	\$171	\$13	\$1,099	\$1,207
2006	\$991	(\$988)	\$165	\$27	\$1,182	\$1,258
2007	\$1,027	(\$1,024)	\$250	\$44	\$1,321	\$1,366
2008	\$1,263	(\$1,262)	\$215	\$181	\$1,659	\$1,655
2009	\$1,148	(\$1,147)	\$170	\$58	\$1,376	\$1,376

**Incendiary or Suspicious**

**Intentional**

Source: NFIRS and NFPA survey. Estimates for 1999-2009 are based on data collected originally in NFIRS 5.0 only. Due to the smaller share of NFIRS data collected in 1999-2001, statistics for these years should be viewed with caution. Numbers in parentheses exclude fires reported as a "confined fire" incident type.

\*Figures for 1991 are distorted by the Oakland wildfire, which by itself accounted for \$1.5 billion in home structure fire damage. This fire was a rekindle of a suspicious fire. The national estimates approach has difficulty handling this fire, and the 1991 figures reflect only a fraction of this fire's loss. Similarly, figures for 1992 are overstated due to problems in handling the 1992 Los Angeles civil disturbance fires. Figures for 1993 are understated because they do not fully reflect losses in the three largest-loss incendiary and suspicious fires of 1993. Figures for 1999 are overstated by roughly half a billion dollars because of a household goods store fire coded as a \$250 million loss where there was no such incident, a probable miscoding of the loss amount. Figures exclude the events of September 11, 2001.

**Table 2.**  
**Intentional Fires, by Case Status**  
**2005-2009**

<b>Case Status</b>	<b>Percent of Incidents</b>
Investigation open	48%
Investigation closed	39%
Investigation inactive	6%
Investigation closed with arrest	4%
Closed with exceptional clearance	2%
Total	100%

Note: These are not projections, but are estimates based on raw incidents reported to U.S. municipal departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades.

This variable was collected in the Arson Module of NFIRS; it is not required that this module be completed and the variable “suspected motive” is also not required. Only 24% of completed arson modules had a value for this field; all others were unknown and are not shown.

Source: NFIRS Arson Module raw data

**Table 3.**  
**Intentional Fires, by Property Ownership**  
**2005-2009**

<b>Property Ownership</b>	<b>Percent of Incidents</b>
Private	88%
City, town, village, or local	6%
Unclassified	3%
County or parish	2%
Other known owner	1%
Total	100%

Note: These are not projections, but are estimates based on raw incidents reported to U.S. municipal departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades.

This variable was collected in the Arson Module of NFIRS; it is not required that this module be completed and the variable “suspected motive” is also not required. Only 16% of completed arson modules had a value for this field; all others were unknown and are not shown.

Source: NFIRS Arson Module raw data

**Table 4.**  
**Intentional Structure Fires, by Structure Status**  
**2005-2009 Annual Averages**

Structure Status	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Occupied and operating	33,900	(63%)	370	(95%)	1,060	(94%)	\$666	(62%)
Vacant and unsecured	6,900	(13%)	10	(2%)	20	(2%)	\$117	(11%)
Unclassified	4,900	(9%)	0	(0%)	0	(0%)	\$9	(1%)
Vacant and secured	4,000	(7%)	10	(2%)	20	(2%)	\$164	(15%)
Idle, not routinely used	1,700	(3%)	0	(0%)	10	(1%)	\$32	(3%)
Being demolished	1,100	(2%)	0	(0%)	0	(0%)	\$2	(0%)
Under construction	800	(1%)	0	(1%)	10	(1%)	\$59	(6%)
Under major renovation	400	(1%)	0	(0%)	0	(0%)	\$19	(2%)
Total	53,700	(100%)	390	(100%)	1,120	(100%)	\$1,068	(100%)

Source: NFIRS and NFPA survey

Sums may not equal totals due to rounding errors.

**Table 5.**  
**Intentional Structure Fires, by Area of Origin**  
**2005-2009 Annual Averages**

**A. Home Structure Fires**

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Bedroom	3,800	(13%)	87	(26%)	300	(33%)	\$121	(19%)
Kitchen or cooking area	3,600	(12%)	22	(7%)	100	(11%)	\$60	(10%)
Unclassified outside area	2,900	(10%)	4	(1%)	10	(1%)	\$8	(1%)
Living room, family room, lounge or den	2,000	(7%)	55	(16%)	100	(10%)	\$64	(10%)
Confined chimney or flue fire	1,600	(5%)	0	(0%)	0	(0%)	\$0	(0%)
Lawn, field or open area	1,400	(5%)	0	(0%)	0	(0%)	\$1	(0%)
Multiple areas of origin	1,200	(4%)	30	(9%)	40	(5%)	\$62	(10%)
Unclassified function area	1,100	(4%)	30	(9%)	50	(5%)	\$42	(7%)
Exterior wall surface	1,000	(3%)	1	(0%)	10	(1%)	\$15	(2%)
Other known area of origin	10,800	(37%)	110	(33%)	310	(34%)	\$258	(41%)
Total	29,400	(100%)	339	(100%)	920	(100%)	\$633	(100%)

**B. Educational Property Structure Fires**

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Lavatory, bathroom, locker room or check room	1,650	(55%)	0	(NA)	14	(69%)	\$1	(2%)
Hallway, corridor, or mall	160	(5%)	0	(NA)	0	(2%)	\$4	(8%)
Trash or rubbish chute, area or container	120	(4%)	0	(NA)	0	(0%)	\$0	(0%)
Unclassified outside area	110	(4%)	0	(NA)	0	(0%)	\$4	(7%)
Small assembly area, less than 100 person capacity	100	(3%)	0	(NA)	1	(3%)	\$4	(6%)
Other known area of origin	860	(29%)	0	(NA)	5	(26%)	\$45	(78%)
Total	3,000	(100%)	0	(NA)	20	(100%)	\$58	(100%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 5. (Continued)**  
**Intentional Structure Fires, by Area of Origin**  
**2005-2009 Annual Averages**

**C. Storage Property Structure Fires**

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Garage or vehicle storage area	720	(22%)	2	(28%)	7	(33%)	\$9	(22%)
Unclassified storage area	470	(15%)	3	(35%)	5	(24%)	\$8	(20%)
Unclassified outside area	280	(9%)	0	(0%)	0	(2%)	\$2	(5%)
Exterior wall surface	250	(8%)	0	(0%)	1	(5%)	\$2	(4%)
Storage of supplies or tools or dead storage	230	(7%)	2	(18%)	1	(5%)	\$3	(7%)
Other known area of origin	1,290	(40%)	1	(19%)	8	(30%)	\$17	(42%)
Total	3,240	(100%)	8	(100%)	22	(100%)	\$41	(100%)

**D. Mercantile or Business Property Structure Fires**

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Lavatory, bathroom, locker room or check room	170	(8%)	1	(16%)	3	(10%)	\$1	(1%)
Unclassified outside area	170	(8%)	0	(0%)	1	(4%)	\$2	(2%)
Sales or showroom area	140	(7%)	1	(14%)	6	(20%)	\$14	(14%)
Office	120	(6%)	1	(16%)	1	(5%)	\$14	(14%)
Exterior wall surface	110	(5%)	0	(0%)	0	(2%)	\$3	(3%)
Trash or rubbish chute, area or container	110	(5%)	0	(0%)	1	(3%)	\$0	(0%)
Lobby or entrance way	100	(5%)	0	(0%)	1	(5%)	\$6	(5%)
Kitchen or cooking area	80	(4%)	0	(12%)	0	(0%)	\$2	(2%)
Unclassified storage area	70	(3%)	0	(0%)	0	(0%)	\$5	(4%)
Unclassified means of egress	60	(3%)	0	(0%)	1	(3%)	\$3	(3%)
Other known area of origin	970	(45%)	1	(43%)	17	(50%)	\$54	(52%)
Total	2,100	(100%)	4	(100%)	31	(100%)	\$104	(100%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 6.**  
**Intentional Structure Fires, by Item First Ignited**  
**2005-2009 Annual Averages**

**A. Home Structure Fires**

<b>Item First Ignited</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Rubbish, trash, or waste	3,800	(13%)	3	(1%)	40	(4%)	\$20	(3%)
Flammable and combustible liquids and gases, piping and filter	2,500	(9%)	128	(38%)	160	(18%)	\$116	(18%)
Magazine, newspaper, writing paper	2,300	(8%)	22	(7%)	60	(7%)	\$27	(4%)
Unclassified item first ignited	2,000	(7%)	8	(2%)	20	(2%)	\$27	(4%)
Mattress or bedding	1,700	(6%)	37	(11%)	180	(19%)	\$65	(10%)
Cooking materials, including food	1,700	(6%)	1	(0%)	30	(3%)	\$3	(0%)
Multiple items first ignited	1,600	(5%)	24	(7%)	40	(4%)	\$83	(13%)
Clothing	1,200	(4%)	15	(4%)	70	(8%)	\$28	(4%)
Floor covering rug, carpet, or mat	1,200	(4%)	18	(5%)	30	(4%)	\$32	(5%)
Other known item first ignited	11,400	(39%)	83	(25%)	290	(31%)	\$231	(36%)
<b>Total</b>	<b>29,400</b>	<b>(100%)</b>	<b>339</b>	<b>(100%)</b>	<b>920</b>	<b>(100%)</b>	<b>\$633</b>	<b>(100%)</b>

**B. Educational Property Structure Fires**

<b>Item First Ignited</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Rubbish, trash, or waste	1,130	(38%)	0	(NA)	6	(28%)	\$1	(1%)
Magazine, newspaper, or writing paper	570	(19%)	0	(NA)	2	(12%)	\$5	(8%)
Rolled or wound material	310	(10%)	0	(NA)	6	(29%)	\$0	(1%)
Unclassified item first ignited	260	(9%)	0	(NA)	1	(3%)	\$6	(10%)
Multiple items first ignited	90	(3%)	0	(NA)	0	(0%)	\$31	(54%)
Other known item first ignited	640	(21%)	0	(NA)	5	(28%)	\$15	(26%)
<b>Total</b>	<b>3,000</b>	<b>(100%)</b>	<b>0</b>	<b>(NA)</b>	<b>20</b>	<b>(100%)</b>	<b>\$58</b>	<b>(100%)</b>

Source: NFIRS and NFPA survey

Sums may not equal totals due to rounding errors.



**Table 6. (Continued)**  
**Intentional Structure Fires, by Item First Ignited**  
**2005-2009 Annual Averages**

**C. Storage Property Structure Fires**

<b>Item First Ignited</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Rubbish, trash, or waste	610	(19%)	0	(0%)	0	(0%)	\$3	(7%)
Flammable and combustible liquids and gases, piping and filter	270	(8%)	4	(50%)	10	(45%)	\$8	(20%)
Exterior wall covering or finish	250	(8%)	0	(0%)	0	(0%)	\$2	(6%)
Structural member or framing	220	(7%)	0	(0%)	1	(2%)	\$2	(5%)
Light vegetation, including grass	220	(7%)	0	(0%)	2	(9%)	\$2	(5%)
Other known item first ignited	1,670	(52%)	4	(50%)	9	(44%)	\$24	(58%)
<b>Total</b>	<b>3,240</b>	<b>(100%)</b>	<b>8</b>	<b>(100%)</b>	<b>22</b>	<b>(100%)</b>	<b>\$41</b>	<b>(100%)</b>

**D. Mercantile or Business Property Structure Fires**

<b>Item First Ignited</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Rubbish, trash, or waste	400	(19%)	0	(0%)	0	(0%)	\$3	(3%)
Flammable and combustible liquids and gases, piping and filter	220	(10%)	1	(18%)	12	(38%)	\$20	(19%)
Magazine, newspaper, or writing paper	200	(10%)	1	(32%)	1	(4%)	\$5	(5%)
Box, carton, bag, basket, or barrel	150	(7%)	0	(0%)	1	(4%)	\$12	(12%)
Unclassified item first ignited	140	(7%)	0	(0%)	1	(2%)	\$7	(7%)
Other known item first ignited	990	(47%)	2	(50%)	15	(52%)	\$57	(55%)
<b>Total</b>	<b>2,100</b>	<b>(100%)</b>	<b>4</b>	<b>(100%)</b>	<b>30</b>	<b>(100%)</b>	<b>\$104</b>	<b>(100%)</b>

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 7.**  
**Intentional Structure Fires, by Heat Source**  
**2005-2009 Annual Averages**

**A. Home Structure Fires**

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Match	7,700	(26%)	63	(18%)	160	(17%)	\$131	(21%)
Lighter	7,600	(26%)	136	(40%)	470	(51%)	\$198	(31%)
Unclassified heat source	2,300	(8%)	23	(7%)	30	(4%)	\$35	(6%)
Incendiary device	1,600	(5%)	22	(6%)	20	(2%)	\$38	(6%)
Hot ember or ash	1,300	(4%)	5	(2%)	10	(2%)	\$6	(1%)
Other known heat source	8,900	(30%)	90	(27%)	230	(25%)	\$225	(36%)
Total	29,400	(100%)	339	(100%)	920	(100%)	\$633	(100%)

**B. Educational Property Structure Fires**

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Lighter	1,390	(46%)	0	(NA)	13	(64%)	\$11	(19%)
Match	810	(27%)	0	(NA)	4	(22%)	\$38	(66%)
Smoking materials	170	(6%)	0	(NA)	2	(12%)	\$0	(0%)
Unclassified heat source	120	(4%)	0	(NA)	1	(3%)	\$1	(2%)
Incendiary device	90	(3%)	0	(NA)	0	(0%)	\$2	(3%)
Other known heat source	420	(14%)	0	(NA)	0	(0%)	\$6	(10%)
Total	3,000	(100%)	0	(NA)	20	(100%)	\$58	(100%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 7. (Continued)**  
**Intentional Structure Fires, by Heat Source**  
**2005-2009 Annual Averages**

**C. Storage Property Structure Fires**

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Match	1,030	(32%)	2	(26%)	5	(23%)	\$9	(22%)
Lighter	880	(27%)	3	(32%)	6	(28%)	\$15	(36%)
Unclassified heat source	240	(8%)	0	(0%)	2	(9%)	\$2	(6%)
Flame or torch used for lighting	220	(7%)	1	(11%)	0	(0%)	\$2	(6%)
Hot ember or ash	140	(4%)	0	(0%)	1	(2%)	\$1	(2%)
Other known heat source	730	(23%)	2	(30%)	8	(38%)	\$12	(29%)
Total	3,240	(100%)	8	(100%)	22	(100%)	\$41	(100%)

**D. Mercantile or Business Property Structure Fires**

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Match	560	(27%)	0	(0%)	8	(25%)	\$13	(13%)
Lighter	500	(24%)	3	(75%)	10	(31%)	\$35	(34%)
Incendiary device	170	(8%)	1	(25%)	7	(21%)	\$18	(18%)
Unclassified heat source	170	(8%)	0	(0%)	0	(0%)	\$7	(7%)
Smoking materials	130	(6%)	0	(0%)	2	(5%)	\$4	(4%)
Other known heat source	570	(27%)	0	(0%)	3	(18%)	\$26	(25%)
Total	2,100	(100%)	4	(100%)	31	(100%)	\$104	(100%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 8.**  
**Intentional Structure Fires, by Day of Week**  
**2005-2009 Annual Averages**

**A. Home Structure Fires**

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	4,600	(16%)	64	(19%)	150	(16%)	\$113	(18%)
Monday	4,200	(14%)	41	(12%)	130	(14%)	\$103	(16%)
Tuesday	4,000	(14%)	55	(16%)	130	(14%)	\$79	(13%)
Wednesday	4,100	(14%)	50	(15%)	140	(15%)	\$84	(13%)
Thursday	3,900	(13%)	27	(8%)	120	(13%)	\$74	(12%)
Friday	4,000	(14%)	48	(14%)	120	(12%)	\$90	(14%)
Saturday	4,500	(15%)	55	(16%)	150	(16%)	\$90	(14%)
Total	29,400	(100%)	339	(100%)	920	(100%)	\$633	(100%)

**B. Educational Property Structure Fires**

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	150	(5%)	0	(NA)	1	(4%)	\$8	(13%)
Monday	510	(17%)	0	(NA)	8	(38%)	\$2	(3%)
Tuesday	570	(19%)	0	(NA)	6	(28%)	\$7	(13%)
Wednesday	540	(18%)	0	(NA)	2	(12%)	\$2	(3%)
Thursday	590	(20%)	0	(NA)	3	(14%)	\$20	(35%)
Friday	480	(16%)	0	(NA)	1	(5%)	\$15	(26%)
Saturday	150	(5%)	0	(NA)	0	(0%)	\$4	(6%)
Total	3,000	(100%)	0	(NA)	20	(100%)	\$58	(100%)

Source: NFIRS and NFPA survey

Sums may not equal totals due to rounding errors.

**Table 8. (Continued)**  
**Intentional Structure Fires, by Day of Week**  
**2005-2009 Annual Averages**

**C. Storage Property Structure Fires**

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	530	(16%)	2	(25%)	6	(28%)	\$9	(23%)
Monday	470	(15%)	1	(10%)	5	(21%)	\$3	(8%)
Tuesday	420	(13%)	2	(29%)	1	(4%)	\$5	(12%)
Wednesday	410	(13%)	0	(4%)	0	(0%)	\$5	(13%)
Thursday	430	(13%)	1	(8%)	3	(13%)	\$7	(16%)
Friday	430	(13%)	1	(8%)	2	(11%)	\$6	(15%)
Saturday	540	(17%)	1	(15%)	5	(22%)	\$6	(13%)
Total	3,240	(100%)	8	(100%)	22	(100%)	\$41	(100%)

**D. Mercantile or Business Property Structure Fires**

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	280	(14%)	1	(14%)	4	(11%)	\$18	(17%)
Monday	320	(15%)	1	(16%)	2	(6%)	\$16	(16%)
Tuesday	310	(15%)	0	(0%)	4	(13%)	\$16	(16%)
Wednesday	290	(14%)	1	(16%)	5	(16%)	\$12	(11%)
Thursday	290	(14%)	0	(12%)	6	(19%)	\$13	(13%)
Friday	290	(14%)	1	(14%)	8	(24%)	\$15	(14%)
Saturday	310	(15%)	1	(28%)	3	(10%)	\$14	(13%)
Total	2,100	(100%)	4	(100%)	31	(100%)	\$104	(100%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 9.**  
**Intentional Structure Fires, by Month**  
**2005-2009 Annual Averages**

**A. Home Structure Fires**

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	2,500	(8%)	41	(12%)	70	(8%)	\$53	(8%)
February	2,200	(7%)	18	(5%)	90	(10%)	\$46	(7%)
March	2,600	(9%)	35	(10%)	90	(9%)	\$51	(8%)
April	2,600	(9%)	30	(9%)	70	(8%)	\$45	(7%)
May	2,600	(9%)	38	(11%)	60	(7%)	\$53	(8%)
June	2,500	(8%)	33	(10%)	90	(10%)	\$47	(7%)
July	2,600	(9%)	26	(8%)	80	(9%)	\$53	(8%)
August	2,500	(9%)	19	(5%)	80	(8%)	\$68	(11%)
September	2,400	(8%)	34	(10%)	70	(8%)	\$49	(8%)
October	2,400	(8%)	21	(6%)	70	(7%)	\$49	(8%)
November	2,400	(8%)	18	(5%)	70	(7%)	\$48	(8%)
December	2,300	(8%)	27	(8%)	80	(8%)	\$70	(11%)
Total	29,400	(100%)	339	(100%)	920	(100%)	\$633	(100%)

**B. Educational Property Structure Fires**

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	270	(9%)	0	(NA)	4	(18%)	\$1	(2%)
February	310	(11%)	0	(NA)	3	(14%)	\$2	(4%)
March	340	(11%)	0	(NA)	3	(14%)	\$1	(2%)
April	300	(10%)	0	(NA)	1	(5%)	\$6	(10%)
May	360	(12%)	0	(NA)	4	(20%)	\$4	(7%)
June	190	(6%)	0	(NA)	2	(11%)	\$9	(15%)
July	110	(4%)	0	(NA)	0	(0%)	\$2	(4%)
August	90	(3%)	0	(NA)	0	(0%)	\$18	(31%)
September	200	(7%)	0	(NA)	0	(0%)	\$2	(4%)
October	290	(10%)	0	(NA)	1	(4%)	\$8	(13%)
November	290	(10%)	0	(NA)	2	(10%)	\$2	(4%)
December	250	(8%)	0	(NA)	1	(5%)	\$3	(5%)
Total	3,000	(100%)	0	(NA)	20	(100%)	\$58	(100%)

Source: NFIRS and NFPA survey

Sums may not equal totals due to rounding errors.

**Table 9. (Continued)**  
**Intentional Structure Fires, by Month**  
**2005-2009 Annual Averages**

**C. Storage Property Structure Fires**

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	220	(7%)	0	(0%)	2	(8%)	\$3	(6%)
February	210	(6%)	0	(0%)	0	(0%)	\$3	(6%)
March	290	(9%)	0	(0%)	2	(9%)	\$4	(10%)
April	330	(10%)	0	(0%)	2	(7%)	\$3	(7%)
May	350	(11%)	0	(4%)	1	(2%)	\$4	(9%)
June	320	(10%)	2	(26%)	5	(22%)	\$4	(10%)
July	330	(10%)	1	(10%)	3	(13%)	\$6	(14%)
August	270	(8%)	0	(0%)	4	(20%)	\$3	(7%)
September	260	(8%)	1	(16%)	0	(0%)	\$4	(9%)
October	250	(8%)	1	(9%)	2	(9%)	\$4	(9%)
November	210	(7%)	3	(34%)	2	(9%)	\$3	(8%)
December	200	(6%)	0	(0%)	0	(2%)	\$2	(5%)
Total	3,240	(100%)	8	(100%)	22	(100%)	\$41	(100%)

**D. Mercantile or Business Property Structure Fires**

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	180	(9%)	0	(0%)	4	(13%)	\$7	(7%)
February	160	(8%)	0	(12%)	1	(3%)	\$6	(6%)
March	160	(7%)	0	(0%)	2	(8%)	\$10	(9%)
April	200	(9%)	0	(0%)	1	(4%)	\$6	(6%)
May	210	(10%)	0	(0%)	2	(6%)	\$10	(9%)
June	180	(8%)	0	(0%)	4	(12%)	\$15	(14%)
July	220	(10%)	1	(14%)	3	(11%)	\$7	(6%)
August	170	(8%)	1	(28%)	3	(8%)	\$13	(12%)
September	160	(8%)	1	(16%)	1	(3%)	\$8	(7%)
October	160	(8%)	1	(14%)	5	(15%)	\$7	(7%)
November	140	(7%)	0	(0%)	1	(5%)	\$9	(9%)
December	170	(8%)	1	(16%)	4	(11%)	\$7	(7%)
Total	2,100	(100%)	4	(100%)	31	(100%)	\$104	(100%)

Source: NFIRS and NFPA survey

Sums may not equal totals due to rounding errors.

**Table 10.**  
**Intentional Structure Fires, by Alarm Hour**  
**2005-2009 Annual Averages**

**A. Home Structure Fires**

Alarm Hour	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight - 3 a.m.	3,400	(12%)	50	(15%)	110	(12%)	\$116	(18%)
3 - 6 a.m.	2,500	(9%)	93	(27%)	110	(12%)	\$102	(16%)
6 - 9 a.m.	2,000	(7%)	31	(9%)	80	(9%)	\$76	(12%)
9 a.m. - noon	2,900	(10%)	40	(12%)	140	(15%)	\$50	(8%)
Noon - 3 p.m.	3,700	(12%)	27	(8%)	120	(13%)	\$52	(8%)
3 - 6 p.m.	4,700	(16%)	28	(8%)	130	(14%)	\$72	(11%)
6 - 9 p.m.	5,400	(18%)	29	(9%)	120	(12%)	\$66	(10%)
9 p.m. - midnight	4,800	(16%)	42	(12%)	120	(13%)	\$99	(16%)
Total	29,400	(100%)	339	(100%)	920	(100%)	\$633	(100%)

**B. Educational Property Structure Fires**

Alarm Hour	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight - 3 a.m.	100	(3%)	0	(NA)	0	(0%)	\$8	(13%)
3 - 6 a.m.	70	(2%)	0	(NA)	0	(0%)	\$11	(18%)
6 - 9 a.m.	220	(7%)	0	(NA)	2	(8%)	\$19	(33%)
9 a.m. - noon	850	(28%)	0	(NA)	13	(62%)	\$2	(3%)
Noon - 3 p.m.	1,060	(35%)	0	(NA)	3	(16%)	\$5	(8%)
3 - 6 p.m.	390	(13%)	0	(NA)	2	(10%)	\$5	(8%)
6 - 9 p.m.	180	(6%)	0	(NA)	0	(0%)	\$8	(13%)
9 p.m. - midnight	140	(5%)	0	(NA)	1	(4%)	\$1	(2%)
Total	3,000	(100%)	0	(NA)	20	(100%)	\$58	(100%)

Source: NFIRS and NFPA survey

Sums may not equal totals due to rounding errors.



**Table 10. (Continued)**  
**Intentional Structure Fires, by Alarm Hour**  
**2005-2009 Annual Averages**

**C. Storage Property Structure Fires**

Alarm Hour	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight - 3 a.m.	420	(13%)	1	(13%)	0	(2%)	\$9	(22%)
3 - 6 a.m.	270	(8%)	0	(4%)	0	(0%)	\$6	(14%)
6 - 9 a.m.	180	(6%)	0	(6%)	0	(0%)	\$2	(4%)
9 a.m. - noon	280	(9%)	1	(17%)	3	(16%)	\$4	(11%)
Noon - 3 p.m.	390	(12%)	0	(0%)	4	(19%)	\$3	(7%)
3 - 6 p.m.	650	(20%)	4	(46%)	11	(48%)	\$8	(18%)
6 - 9 p.m.	610	(19%)	0	(0%)	2	(8%)	\$5	(12%)
9 p.m. - midnight	450	(14%)	1	(14%)	2	(8%)	\$4	(10%)
Total	3,240	(100%)	8	(100%)	22	(100%)	\$41	(100%)

**D. Mercantile or Business Property Structure Fires**

Alarm Hour	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight - 3 a.m.	330	(16%)	3	(70%)	3	(9%)	\$29	(28%)
3 - 6 a.m.	260	(12%)	1	(16%)	1	(3%)	\$19	(18%)
6 - 9 a.m.	190	(9%)	0	(0%)	0	(2%)	\$4	(4%)
9 a.m. - noon	200	(10%)	1	(14%)	6	(18%)	\$6	(5%)
Noon - 3 p.m.	210	(10%)	0	(0%)	3	(9%)	\$4	(4%)
3 - 6 p.m.	270	(13%)	0	(0%)	9	(27%)	\$11	(11%)
6 - 9 p.m.	310	(15%)	0	(0%)	6	(20%)	\$9	(9%)
9 p.m. - midnight	330	(16%)	0	(0%)	4	(12%)	\$21	(20%)
Total	2,100	(100%)	4	(100%)	31	(100%)	\$104	(100%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 11.**  
**Intentional Outside or Unclassified Fires, by Area of Origin**  
**2005-2009 Annual Averages**

<b>Area of Origin</b>	<b>Fires</b>	<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Unclassified outside area	72,900	(32%)	3	(17%)	40	(26%)	\$5 (8%)
Outside or unclassified non-trash	26,500	(12%)	2	(13%)	30	(16%)	\$4 (6%)
Outside trash or rubbish	46,500	(20%)	1	(4%)	20	(10%)	\$1 (1%)
Lawn, field or open area	68,700	(30%)	5	(34%)	50	(30%)	\$6 (10%)
Outside or unclassified non-trash	31,900	(14%)	5	(29%)	40	(23%)	\$4 (7%)
Outside trash or rubbish	36,900	(16%)	1	(5%)	10	(7%)	\$2 (3%)
On or near highway, public way or street	23,600	(10%)	2	(11%)	10	(6%)	\$1 (1%)
Outside or unclassified non-trash	5,600	(2%)	2	(11%)	10	(4%)	\$1 (1%)
Outside trash or rubbish	18,000	(8%)	0	(0%)	0	(2%)	\$0 (1%)
Wildland area or woods	12,100	(5%)	2	(12%)	10	(9%)	\$2 (3%)
Outside or unclassified non-trash	9,200	(4%)	2	(12%)	10	(8%)	\$2 (3%)
Outside trash or rubbish	2,900	(1%)	0	(0%)	0	(0%)	\$0 (0%)
Vegetation area - wildland module	10,600	(5%)	1	(4%)	10	(5%)	\$31 (51%)
Outside or unclassified non-trash	10,600	(5%)	1	(4%)	10	(5%)	\$31 (51%)
Outside trash or rubbish	0	(0%)	0	(0%)	0	(0%)	\$0 (0%)
Trash or rubbish chute, area or container	10,100	(4%)	0	(2%)	0	(1%)	\$1 (1%)
Outside or unclassified non-trash	200	(0%)	0	(0%)	0	(0%)	\$0 (0%)
Outside trash or rubbish	9,900	(4%)	0	(2%)	0	(1%)	\$0 (1%)
Unclassified area of origin	8,300	(4%)	1	(4%)	10	(4%)	\$2 (4%)
Outside or unclassified non-trash	3,900	(2%)	1	(4%)	10	(3%)	\$2 (4%)
Outside trash or rubbish	4,400	(2%)	0	(0%)	0	(0%)	\$0 (0%)
Courtyard, terrace or patio	7,000	(3%)	0	(0%)	10	(7%)	\$1 (1%)
Outside or unclassified non-trash	2,000	(1%)	0	(0%)	10	(6%)	\$0 (1%)
Outside trash or rubbish	5,000	(2%)	0	(0%)	0	(1%)	\$0 (0%)
Other known area of origin	15,800	(7%)	2	(16%)	20	(12%)	\$13 (21%)
Outside or unclassified non-trash	6,100	(3%)	2	(13%)	20	(12%)	\$12 (19%)
Outside trash or rubbish	9,700	(4%)	0	(3%)	0	(0%)	\$1 (2%)
<b>Total</b>	<b>229,200</b>	<b>(100%)</b>	<b>15</b>	<b>(100%)</b>	<b>170</b>	<b>(100%)</b>	<b>\$61 (100%)</b>
Outside or unclassified non-trash	95,900	(42%)	13	(86%)	130	(77%)	\$57 (92%)
Outside trash or rubbish	133,300	(58%)	2	(14%)	40	(23%)	\$5 (8%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 12.**  
**Intentional Outside or Unclassified Fires, by Heat Source**  
**2005-2009 Annual Averages**

<b>Heat Source</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
<b>Match</b>	93,300	(41%)	5	(33%)	40	(24%)	\$23	(38%)
Outside or unclassified non-trash	32,800	(14%)	5	(30%)	30	(20%)	\$21	(35%)
Outside trash or rubbish	60,400	(26%)	0	(3%)	10	(4%)	\$2	(3%)
<b>Lighter</b>	46,100	(20%)	5	(32%)	70	(43%)	\$12	(20%)
Outside or unclassified non-trash	17,200	(8%)	4	(25%)	50	(29%)	\$11	(18%)
Outside trash or rubbish	28,900	(13%)	1	(7%)	20	(14%)	\$1	(2%)
<b>Unclassified heat source</b>	25,900	(11%)	1	(5%)	10	(3%)	\$8	(13%)
Outside or unclassified non-trash	11,800	(5%)	1	(5%)	0	(3%)	\$7	(12%)
Outside trash or rubbish	14,100	(6%)	0	(0%)	0	(0%)	\$0	(0%)
<b>Flame or torch used for lighting</b>	14,800	(6%)	2	(14%)	10	(7%)	\$3	(5%)
Outside or unclassified non-trash	7,800	(3%)	2	(14%)	10	(7%)	\$3	(4%)
Outside trash or rubbish	7,000	(3%)	0	(0%)	0	(1%)	\$0	(0%)
<b>Hot ember or ash</b>	10,700	(5%)	0	(2%)	10	(4%)	\$2	(3%)
Outside or unclassified non-trash	5,800	(3%)	0	(2%)	0	(3%)	\$2	(3%)
Outside trash or rubbish	4,900	(2%)	0	(0%)	0	(1%)	\$0	(0%)
<b>Unclassified hot or smoldering object</b>	8,300	(4%)	0	(0%)	0	(2%)	\$2	(4%)
Outside or unclassified non-trash	3,600	(2%)	0	(0%)	0	(2%)	\$2	(3%)
Outside trash or rubbish	4,700	(2%)	0	(0%)	0	(0%)	\$1	(1%)
<b>Smoking materials</b>	7,800	(3%)	1	(4%)	0	(2%)	\$1	(2%)
Outside or unclassified non-trash	2,200	(1%)	0	(0%)	0	(2%)	\$1	(2%)
Outside trash or rubbish	5,600	(2%)	1	(4%)	0	(0%)	\$0	(0%)
<b>Fireworks</b>	6,000	(3%)	0	(2%)	10	(3%)	\$1	(2%)
Outside or unclassified non-trash	4,600	(2%)	0	(2%)	10	(3%)	\$1	(2%)
Outside trash or rubbish	1,400	(1%)	0	(0%)	0	(0%)	\$0	(0%)
<b>Other known heat source</b>	16,300	(7%)	1	(8%)	20	(12%)	\$8	(14%)
Outside or unclassified non-trash	10,000	(4%)	1	(8%)	20	(9%)	\$8	(13%)
Outside trash or rubbish	6,300	(3%)	0	(0%)	0	(2%)	\$0	(1%)
<b>Total</b>	229,200	(100%)	15	(100%)	170	(100%)	\$61	(100%)
Outside or unclassified non-trash	95,900	(42%)	13	(86%)	130	(77%)	\$57	(92%)
Outside trash or rubbish	133,300	(58%)	2	(14%)	40	(23%)	\$5	(8%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 13.**  
**Intentional Outside or Unclassified Fires, by Item First Ignited**  
**2005-2009 Annual Averages**

<b>Item First Ignited</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Light vegetation, including grass	63,700	(28%)	3	(22%)	30	(20%)	\$9	(15%)
Outside or unclassified non-trash	46,900	(20%)	3	(22%)	30	(19%)	\$9	(14%)
Outside trash or rubbish	16,800	(7%)	0	(0%)	0	(1%)	\$0	(1%)
Rubbish, trash, or waste	57,100	(25%)	1	(9%)	20	(10%)	\$4	(6%)
Outside or unclassified non-trash	4,400	(2%)	0	(3%)	0	(1%)	\$2	(4%)
Outside trash or rubbish	52,700	(23%)	1	(6%)	10	(9%)	\$1	(2%)
Heavy vegetation including trees	19,400	(8%)	1	(5%)	10	(6%)	\$4	(6%)
Outside or unclassified non-trash	12,900	(6%)	1	(5%)	10	(4%)	\$3	(6%)
Outside trash or rubbish	6,500	(3%)	0	(0%)	0	(2%)	\$0	(0%)
Unclassified organic materials	15,800	(7%)	1	(3%)	0	(2%)	\$2	(3%)
Outside or unclassified non-trash	9,000	(4%)	1	(3%)	0	(2%)	\$1	(2%)
Outside trash or rubbish	6,700	(3%)	0	(0%)	0	(0%)	\$1	(1%)
Unclassified item first ignited	15,200	(7%)	0	(2%)	10	(5%)	\$7	(11%)
Outside or unclassified non-trash	6,900	(3%)	0	(2%)	10	(4%)	\$7	(11%)
Outside trash or rubbish	8,300	(4%)	0	(0%)	0	(1%)	\$0	(0%)
Magazine, newspaper, or writing paper	11,300	(5%)	0	(0%)	10	(5%)	\$2	(3%)
Outside or unclassified non-trash	2,500	(1%)	0	(0%)	10	(3%)	\$1	(2%)
Outside trash or rubbish	8,800	(4%)	0	(0%)	0	(2%)	\$0	(0%)
Multiple items first ignited	7,200	(3%)	0	(0%)	0	(2%)	\$4	(6%)
Outside or unclassified non-trash	1,100	(0%)	0	(0%)	0	(1%)	\$2	(3%)
Outside trash or rubbish	6,100	(3%)	0	(0%)	0	(1%)	\$2	(3%)
Upholstered furniture or vehicle seat	5,100	(2%)	0	(0%)	0	(1%)	\$1	(1%)
Outside or unclassified non-trash	400	(0%)	0	(0%)	0	(0%)	\$1	(1%)
Outside trash or rubbish	4,800	(2%)	0	(0%)	0	(1%)	\$0	(0%)
Other known item first ignited	34,400	(15%)	9	(59%)	80	(49%)	\$31	(50%)
Outside or unclassified non-trash	11,800	(5%)	8	(51%)	70	(42%)	\$30	(49%)
Outside trash or rubbish	22,600	(10%)	1	(8%)	10	(7%)	\$0	(1%)
<b>Total</b>	<b>229,200</b>	<b>(100%)</b>	<b>15</b>	<b>(100%)</b>	<b>170</b>	<b>(100%)</b>	<b>\$61</b>	<b>(100%)</b>
Outside or unclassified non-trash	95,900	(42%)	13	(86%)	130	(77%)	\$57	(92%)
Outside trash or rubbish	133,300	(58%)	2	(14%)	40	(23%)	\$5	(8%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 14.**  
**Intentional Outside or Unclassified Fires, by Day of Week**  
**2005-2009 Annual Averages**

<b>Day of Week</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Sunday	36,200	(16%)	1	(8%)	20	(15%)	\$19	(32%)
Monday	32,400	(14%)	2	(14%)	20	(14%)	\$7	(12%)
Tuesday	30,600	(13%)	2	(15%)	20	(12%)	\$4	(6%)
Wednesday	30,100	(13%)	2	(15%)	20	(14%)	\$18	(29%)
Thursday	29,000	(13%)	3	(18%)	30	(16%)	\$3	(5%)
Friday	31,200	(14%)	3	(17%)	20	(12%)	\$4	(6%)
Saturday	39,700	(17%)	2	(13%)	30	(17%)	\$7	(11%)
Total	229,200	(100%)	15	(100%)	170	(100%)	\$61	(100%)

**Table 15.**  
**Intentional Outside or Unclassified Fires, by Alarm Hour**  
**2005-2009 Annual Averages**

<b>Alarm Hour</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Midnight - 3 a.m.	17,300	(8%)	1	(8%)	10	(6%)	\$6	(9%)
3 - 6 a.m.	8,900	(4%)	1	(5%)	10	(4%)	\$4	(6%)
6 - 9 a.m.	9,900	(4%)	1	(9%)	0	(3%)	\$1	(2%)
9 a.m. - noon	21,200	(9%)	1	(7%)	20	(12%)	\$2	(3%)
Noon - 3 p.m.	37,900	(17%)	4	(26%)	40	(23%)	\$33	(54%)
3 - 6 p.m.	49,000	(21%)	4	(23%)	40	(27%)	\$6	(10%)
6 - 9 p.m.	51,000	(22%)	2	(11%)	30	(18%)	\$4	(6%)
9 p.m. - midnight	33,900	(15%)	2	(11%)	10	(8%)	\$6	(10%)
Total	229,200	(100%)	15	(100%)	170	(100%)	\$61	(100%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 16.**  
**Intentional Outside or Unclassified Fires, by Month**  
**2005-2009 Annual Averages**

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	18,000	(8%)	1	(9%)	10	(6%)	\$3	(4%)
February	15,700	(7%)	1	(4%)	10	(7%)	\$2	(3%)
March	25,100	(11%)	3	(20%)	20	(14%)	\$4	(6%)
April	24,700	(11%)	3	(19%)	20	(11%)	\$2	(3%)
May	20,500	(9%)	1	(7%)	10	(8%)	\$3	(4%)
June	19,300	(8%)	1	(4%)	10	(8%)	\$18	(29%)
July	22,200	(10%)	1	(5%)	20	(12%)	\$3	(4%)
August	17,000	(7%)	0	(3%)	10	(7%)	\$15	(24%)
September	16,800	(7%)	1	(10%)	20	(11%)	\$6	(10%)
October	16,900	(7%)	0	(3%)	10	(6%)	\$3	(4%)
November	18,800	(8%)	2	(10%)	10	(6%)	\$2	(3%)
December	14,000	(6%)	1	(7%)	10	(4%)	\$3	(5%)
Total	229,200	(100%)	15	(100%)	170	(100%)	\$61	(100%)

**Table 17.**  
**Intentional Vehicle Fires, by Heat Source**  
**2005-2009 Annual Averages**

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Match	6,600	(28%)	9	(27%)	10	(20%)	\$50	(26%)
Lighter	3,300	(14%)	11	(33%)	30	(42%)	\$22	(11%)
Incendiary device	3,100	(13%)	1	(4%)	10	(8%)	\$26	(13%)
Unclassified heat source	2,500	(11%)	1	(3%)	0	(2%)	\$19	(10%)
Flame or torch used for lighting	1,500	(6%)	1	(2%)	0	(3%)	\$12	(6%)
Smoking materials	1,000	(4%)	2	(5%)	10	(8%)	\$8	(4%)
Multiple heat sources including multiple ignitions	1,000	(4%)	0	(0%)	0	(1%)	\$12	(6%)
Unclassified hot or smoldering object	800	(4%)	1	(4%)	0	(1%)	\$4	(2%)
Unclassified heat from powered equipment	600	(2%)	1	(2%)	0	(3%)	\$2	(1%)
Radiated or conducted heat from operating equipment	400	(2%)	1	(2%)	0	(0%)	\$2	(1%)
Fireworks	400	(2%)	0	(0%)	0	(2%)	\$20	(11%)
Spark, ember or flame from operating equipment	400	(2%)	1	(1%)	0	(2%)	\$2	(1%)
Arcing	400	(2%)	0	(0%)	0	(0%)	\$1	(0%)
Other known heat source	1,500	(6%)	6	(17%)	0	(7%)	\$10	(5%)
Total	23,400	(100%)	35	(100%)	70	(100%)	\$192	(100%)

Source: NFIRS and NFPA survey

Sums may not equal totals due to rounding errors.

**Table 18.**  
**Intentional Vehicle Fires, by Item First Ignited**  
**2005-2009 Annual Averages**

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Upholstered furniture or vehicle seat	7,300	(31%)	2	(6%)	10	(8%)	\$63	(33%)
Flammable and combustible liquids and gases, piping or filter	6,500	(28%)	25	(71%)	40	(58%)	\$52	(27%)
Unclassified item first ignited	2,700	(12%)	3	(10%)	0	(7%)	\$20	(10%)
Multiple items first ignited	2,300	(10%)	2	(7%)	10	(8%)	\$20	(10%)
Magazine, newspaper, or writing paper	700	(3%)	1	(2%)	0	(2%)	\$3	(2%)
Electrical wire or cable insulation	600	(3%)	0	(0%)	0	(0%)	\$2	(1%)
Rubbish, trash, or waste	500	(2%)	0	(0%)	0	(1%)	\$2	(1%)
Clothing	400	(2%)	1	(2%)	0	(4%)	\$1	(1%)
Tire	400	(2%)	0	(0%)	0	(0%)	\$2	(1%)
Other known item first ignited	2,000	(8%)	1	(4%)	10	(13%)	\$27	(14%)
Total	23,400	(100%)	35	(100%)	70	(100%)	\$192	(100%)

**Table 19.**  
**Intentional Vehicle Fires, by Area of Origin**  
**2005-2009 Annual Averages**

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Passenger area of vehicle	12,200	(52%)	22	(64%)	40	(59%)	\$102	(53%)
Unclassified vehicle area	3,100	(13%)	3	(10%)	0	(6%)	\$27	(14%)
Engine area, running gear or wheel area vehicle	2,200	(10%)	2	(6%)	10	(8%)	\$13	(7%)
Exterior surface of vehicle	1,800	(8%)	0	(1%)	10	(8%)	\$8	(4%)
Cargo or trunk area of vehicle	1,300	(5%)	2	(5%)	10	(9%)	\$11	(6%)
Fuel tank or fuel line of vehicle	700	(3%)	2	(6%)	0	(5%)	\$3	(2%)
Unclassified area of origin	500	(2%)	0	(1%)	0	(0%)	\$4	(2%)
Unclassified outside area	400	(2%)	0	(0%)	0	(1%)	\$2	(1%)
Other known area of origin	1,300	(5%)	2	(6%)	0	(5%)	\$23	(12%)
Total	23,400	(100%)	35	(100%)	70	(100%)	\$192	(100%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.

**Table 20.**  
**Intentional Vehicle Fires, by Day of Week**  
**2005-2009 Annual Averages**

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	4,200	(18%)	4	(11%)	10	(18%)	\$34	(18%)
Monday	3,300	(14%)	6	(16%)	10	(14%)	\$36	(19%)
Tuesday	3,200	(14%)	5	(16%)	0	(4%)	\$24	(12%)
Wednesday	3,000	(13%)	4	(10%)	10	(14%)	\$23	(12%)
Thursday	2,900	(13%)	7	(19%)	10	(13%)	\$22	(11%)
Friday	3,000	(13%)	4	(12%)	10	(14%)	\$23	(12%)
Saturday	3,700	(16%)	6	(16%)	20	(23%)	\$30	(16%)
Total	23,400	(100%)	35	(100%)	70	(100%)	\$192	(100%)

**Table 21.**  
**Intentional Vehicle Fires, by Month**  
**2005-2009 Annual Averages**

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	1,800	(8%)	4	(13%)	0	(4%)	\$16	(8%)
February	1,600	(7%)	2	(6%)	0	(5%)	\$13	(7%)
March	1,900	(8%)	4	(11%)	0	(4%)	\$16	(8%)
April	1,900	(8%)	3	(8%)	10	(10%)	\$14	(7%)
May	2,000	(9%)	2	(7%)	10	(15%)	\$14	(7%)
June	2,100	(9%)	3	(9%)	10	(11%)	\$16	(9%)
July	2,400	(10%)	1	(4%)	10	(12%)	\$27	(14%)
August	2,200	(9%)	3	(9%)	10	(15%)	\$16	(9%)
September	2,000	(8%)	4	(10%)	0	(7%)	\$15	(8%)
October	1,900	(8%)	4	(11%)	0	(5%)	\$15	(8%)
November	1,800	(8%)	4	(11%)	0	(6%)	\$15	(8%)
December	1,700	(7%)	1	(2%)	10	(7%)	\$14	(7%)
Total	23,400	(100%)	35	(100%)	70	(100%)	\$192	(100%)

Source: NFIRS and NFPA survey  
Sums may not equal totals due to rounding errors.



**Table 22.**  
**Intentional Vehicle Fires, by Alarm Hour**  
**2005-2009 Annual Averages**

Alarm Hour	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight - 3 a.m.	6,000	(26%)	8	(22%)	10	(18%)	\$52	(27%)
3 - 6 a.m.	4,400	(19%)	4	(11%)	10	(13%)	\$36	(19%)
6 - 9 a.m.	1,600	(7%)	3	(9%)	0	(3%)	\$11	(6%)
9 a.m. - noon	1,100	(5%)	4	(10%)	0	(7%)	\$6	(3%)
Noon - 3 p.m.	1,200	(5%)	4	(12%)	10	(12%)	\$6	(3%)
3 - 6 p.m.	1,400	(6%)	6	(17%)	10	(21%)	\$19	(10%)
6 - 9 p.m.	2,400	(10%)	3	(10%)	10	(8%)	\$16	(8%)
9 p.m. - midnight	5,200	(22%)	3	(8%)	10	(18%)	\$45	(23%)
Total	23,400	(100%)	35	(100%)	70	(100%)	\$192	(100%)

Source: NFIRS and NFPA survey

Sums may not equal totals due to rounding errors.

**Table 23.**  
**Percent of Arson Offenses Cleared by Arrest or Exceptional Means, by Region**  
**By Year 1984-2009**

Year	Nation	Northeast	Midwest	South	West
1984	17	15	13	22	16
1985	17	13	16	22	15
1986	15	12	13	20	15
1987	16	13	13	20	15
1988	15	12	12	21	14
1989	15	11	14	20	14
1990	15	11	11	21	15
1991	16	12	13	21	16
1992	15	13	11	21	13
1993	15	13	12	20	15
1994	15	10	14	21	15
1995	16	11	16	20	15
1996	16	14	16	20	15
1997	18	16	16	22	15
1998	16	17	15	20	13
1999	17	17	18	19	14
2000	16	17	15	18	14
2001	16	20	15	18	14
2002	17	20	15	19	14
2003	17	21	16	19	14
2004	17	22	15	19	15
2005	18	22	17	19	16
2006	18	23	16	21	15
2007	18	24	16	20	16
2008	18	24	16	19	16
2009	19	25	16	20	16

\*Source: FBI Crime in the United States Series, Table 26

**Table 24.**  
**Percent of Arson Arrests by Age**  
**2009**

Age	Fires
Under 10	2%
10 to 12	8%
13 to 14	16%
15	7%
16	6%
17	5%
18	4%
19	4%
20	3%
21	2%
22	3%
23	2%
24	2%
25-29	8%
30-34	6%
35-39	5%
40-44	5%
45-49	5%
50-54	3%
55-59	2%
60-64	1%
65 and over	1%
Ages under 15	26%
Ages under 18	44%
Ages 18 and over	56%
Total	100%

\*Source: FBI Crime in the United States Series, Table 38

**Table 25.**  
**Percent of Arson Arrests by Age**  
**1980-2009**

<b>Year</b>	<b>Under 10</b>	<b>10 to 12</b>	<b>13 to 14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>All Under 18</b>
1980	7	7	11	7	6	6	44
1981	7	8	11	5	5	6	42
1982	6	7	9	5	5	5	37
1983	7	7	10	5	4	4	37
1984	8	8	12	6	5	4	43
1985	7	7	12	6	5	4	41
1986	7	7	11	6	5	4	40
1987	7	8	11	6	5	4	41
1988	8	9	12	6	4	4	43
1989	8	9	13	5	4	4	43
1990	7	10	12	6	5	4	44
1991	7	11	14	6	5	4	47
1992	6	11	15	7	5	5	49
1993	6	10	16	7	5	5	49
1994	7	12	18	7	6	5	55
1995	6	12	17	7	5	5	52
1996	7	12	17	7	6	5	53
1997	6	11	16	7	6	5	50
1998	6	12	17	7	6	5	52
1999	7	12	17	8	5	5	54
2000	6	13	16	7	6	5	53
2001	5	11	15	7	6	5	49
2002	5	11	15	7	6	5	49
2003	3	10	18	9	6	5	51
2004	3	10	17	8	7	5	50
2005	3	9	17	8	6	5	49
2006	3	9	16	8	7	5	49
2007	3	9	16	8	6	5	47
2008	3	8	15	8	6	6	47
2009	2	8	16	7	5	6	44

Source: FBI *Crime in the United States* series.

**Table 26.**  
**U.S. Intentional Structure Fire and Arson Offense Rates**  
**by Size of Community**

<b>A. Intentional Structure Fires per 100,000 Population</b>								
<b>Year</b>	<b>Under 2,500</b>	<b>2,500 to 4,999</b>	<b>5,000 to 9,999</b>	<b>10,000 to 24,999</b>	<b>25,000 to 49,000</b>	<b>50,000 to 99,000</b>	<b>100,000 to 249,999</b>	<b>250,000 or more</b>
1993	18	16	11	11	15	20	27	36
1994	16	14	12	13	14	20	29	32
1995	24	19	15	12	14	17	31	34
1996	23	12	13	11	14	16	29	30
1997	18	16	11	14	12	15	25	31
1998	15	15	10	11	11	18	24	26
1999	20	13	14	10	8	12	16	26
2000	18	17	10	9	10	15	19	26
2001	15	7	8	10	11	14	20	28
2002	10	8	11	13	12	15	20	27
2003	14	9	8	8	9	13	15	21
2004	11	8	7	8	9	11	15	21
2005	11	6	7	7	10	11	11	16
2006	7	7	7	7	9	9	15	15
2007	15	9	8	6	9	9	13	15
2008	10	8	7	6	9	10	13	14
2009	9	9	7	7	10	11	11	16

Source for Part A: NFPA survey and U.S. Census Bureau resident population statistics.

**Table 26.**  
**U.S. Intentional Structure Fire and Arson Offense Rates**  
**by Size of Community**

<b>B. Arson Offenses in All Properties per 100,000 Population</b>						
<b>Year</b>	<b>Cities under 10,000</b>	<b>10,000 to 24,999</b>	<b>25,000 to 49,999</b>	<b>50,000 to 99,999</b>	<b>100,000 to 249,999</b>	<b>250,000 or more</b>
1993	28	26	34	41	63	86
1994	31	28	37	43	66	84
1995	35	29	36	42	60	83
1996	30	27	36	41	50	84
1997	28	24	31	36	52	78
1998	28	22	28	34	43	75
1999	26	21	27	33	43	71
2000	24	19	26	31	40	67
2001	27	21	25	32	38	62
2002	25	20	24	29	39	59
2003	22	20	23	28	35	53
2004	22	19	23	26	30	49
2005	21	18	23	24	30	46
2006	22	19	22	26	30	45
2007	21	18	21	24	29	41
2008	21	18	20	23	26	39
2009	19	14	17	20	22	32

Note: FBI rates include non-structure fires (i.e., vehicles, outdoor fires) as well as structures. The FBI uses cities and other communities; the NFPA uses population coverage areas of fire departments. The FBI figures for cities under 10,000 population and rural counties may not correspond exactly to rates for communities of 2,500 to 9,999 and under 2,500 population, the definitions used in the NFPA survey. The FBI also reports rates for suburban counties and areas. As of 2003, FBI statistics replaced rural counties with non-metropolitan counties. NFPA statistics are for incendiary fires through 2000 and for intentional fires from 2001 on.

Source for Part B: FBI and U.S. Census Bureau resident population statistics.

## Appendix A.

### How National Estimates Statistics are Calculated

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The statistics in this analysis are estimates derived from the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual survey of U.S. fire departments. NFIRS is a voluntary system by which participating fire departments report detailed factors about the fires to which they respond. Roughly two-thirds of U.S. fire departments participate, although not all of these departments provide data every year. Fires reported to federal or state fire departments or industrial fire brigades are not included in these estimates.

NFIRS provides the most detailed incident information of any national database not limited to large fires. NFIRS is the only database capable of addressing national patterns for fires of all sizes by specific property use and specific fire cause. NFIRS also captures information on the extent of flame spread, and automatic detection and suppression equipment. For more information about NFIRS visit <http://www.nfirs.fema.gov/>. Copies of the paper forms may be downloaded from [http://www.nfirs.fema.gov/documentation/design/NFIRS\\_Paper\\_Forms\\_2008.pdf](http://www.nfirs.fema.gov/documentation/design/NFIRS_Paper_Forms_2008.pdf).

NFIRS has a wide variety of data elements and code choices. The NFIRS database contains coded information. Many code choices describe several conditions. These cannot be broken down further. For example, area of origin code 83 captures fires starting in vehicle engine areas, running gear areas or wheel areas. It is impossible to tell the portion of each from the coded data.

#### **Methodology may change slightly from year to year.**

NFPA is continually examining its methodology to provide the best possible answers to specific questions, methodological and definitional changes can occur. *Earlier editions of the same report may have used different methodologies to produce the same analysis, meaning that the estimates are not directly comparable from year to year.*

#### **NFPA's fire department experience survey provides estimates of the big picture.**

Each year, NFPA conducts an annual survey of fire departments which enables us to capture a summary of fire department experience on a larger scale. Surveys are sent to all municipal departments protecting populations of 50,000 or more and a random sample, stratified by community size, of the smaller departments. Typically, a total of roughly 3,000 surveys are returned, representing about one of every ten U.S. municipal fire departments and about one third of the U.S. population.

The survey is stratified by size of population protected to reduce the uncertainty of the final estimate. Small rural communities have fewer people protected per department and are less likely to respond to the survey. A larger number must be surveyed to obtain an adequate sample of those departments. (NFPA also makes follow-up calls to a sample of the smaller fire departments that do not respond, to confirm that those that did respond are truly representative of fire departments their size.) On the other hand, large city departments are so few in number and protect such a large proportion of the total U.S.

population that it makes sense to survey all of them. Most respond, resulting in excellent precision for their part of the final estimate.

The survey includes the following information: (1) the total number of fire incidents, civilian deaths, and civilian injuries, and the total estimated property damage (in dollars), for each of the major property use classes defined in NFIRS; (2) the number of on-duty firefighter injuries, by type of duty and nature of illness; (3) the number and nature of non-fire incidents; and (4) information on the type of community protected (e.g., county versus township versus city) and the size of the population protected, which is used in the statistical formula for projecting national totals from sample results. The results of the survey are published in the annual report *Fire Loss in the United States*. To download a free copy of the report, visit <http://www.nfpa.org/assets/files/PDF/OS.fireloss.pdf>.

### **Projecting NFIRS to National Estimates**

As noted, NFIRS is a voluntary system. Different states and jurisdictions have different reporting requirements and practices. Participation rates in NFIRS are not necessarily uniform across regions and community sizes, both factors correlated with frequency and severity of fires. This means NFIRS may be susceptible to systematic biases. No one at present can quantify the size of these deviations from the ideal, representative sample, so no one can say with confidence that they are or are not serious problems. But there is enough reason for concern so that a second database -- the NFPA survey -- is needed to project NFIRS to national estimates and to project different parts of NFIRS separately. This multiple calibration approach makes use of the annual NFPA survey where its statistical design advantages are strongest.

Scaling ratios are obtained by comparing NFPA's projected totals of residential structure fires, non-residential structure fires, vehicle fires, and outside and other fires, and associated civilian deaths, civilian injuries, and direct property damage with comparable totals in NFIRS. Estimates of specific fire problems and circumstances are obtained by multiplying the NFIRS data by the scaling ratios. Reports for incidents in which mutual aid was given are excluded from NFPA's analyses.

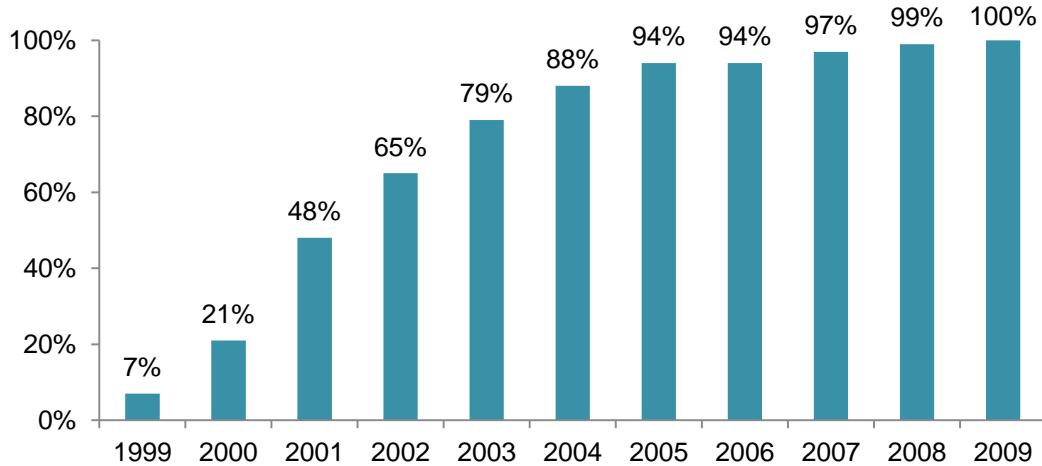
Analysts at the NFPA, the USFA and the Consumer Product Safety Commission developed the specific basic analytical rules used for this procedure. "The National Estimates Approach to U.S. Fire Statistics," by John R. Hall, Jr. and Beatrice Harwood, provides a more detailed explanation of national estimates. A copy of the article is available online at <http://www.nfpa.org/osds> or through NFPA's One-Stop Data Shop.

Version 5.0 of NFIRS, first introduced in 1999, used a different coding structure for many data elements, added some property use codes, and dropped others. The essentials of the approach described by Hall and Harwood are still used, but some modifications have been necessary to accommodate the changes in NFIRS 5.0.

Figure A.1 shows the percentage of fires originally collected in the NFIRS 5.0 system. Each year's release version of NFIRS data also includes data collected in older versions of NFIRS that were converted to NFIRS 5.0 codes.



**Figure A.1. Fires Originally Collected in NFIRS 5.0 by Year**



From 1999 data on, analyses are based on scaling ratios using only data originally collected in NFIRS 5.0:

$$\frac{\text{NFPA survey projections}}{\text{NFIRS totals (Version 5.0)}}$$

For 1999 to 2001, the same rules may be applied, but estimates for these years in this form will be less reliable due to the smaller amount of data originally collected in NFIRS 5.0; they should be viewed with extreme caution.

NFIRS 5.0 introduced six categories of confined structure fires, including:

- cooking fires confined to the cooking vessel,
- confined chimney or flue fires,
- confined incinerator fire,
- confined fuel burner or boiler fire or delayed ignition,
- confined commercial compactor fire, and
- trash or rubbish fires in a structure with no flame damage to the structure or its contents.

Although causal and other detailed information is typically not required for these incidents, it is provided in some cases. Some analyses, particularly those that examine cooking equipment, heating equipment, fires caused by smoking materials, and fires started by playing with fire, may examine the confined fires in greater detail. Because the confined fire incident types describe certain scenarios, the distribution of unknown data differs from that of all fires. Consequently, allocation of unknowns must be done separately.

Some analyses of structure fires show only non-confined fires. In these tables, percentages shown are of non-confined structure fires rather than all structure fires. This approach has the advantage of showing the frequency of specific factors in fire causes, but the disadvantage of possibly overstating the percentage of factors that are seldom seen in the confined fire incident types and of understating the factors specifically associated with the confined fire incident types.

Other analyses include entries for confined fire incident types in the causal tables and show percentages based on total structure fires. In these cases, the confined fire incident type is treated as a general causal factor.

For most fields other than Property Use and Incident Type, NFPA allocates unknown data proportionally among known data. This approach assumes that if the missing data were known, it would be distributed in the same manner as the known data. NFPA makes additional adjustments to several fields. *Casualty and loss projections can be heavily influenced by the inclusion or exclusion of unusually serious fire.*

In the formulas that follow, the term “all fires” refers to all fires in NFIRS on the dimension studied. The percentages of fires with known or unknown data are provided for non-confined fires and associated losses, and for confined fires only.

**Cause of Ignition:** This field is used chiefly to identify intentional fires. “Unintentional” in this field is a specific entry and does not include other fires that were not intentionally set: failure of equipment or heat source, act of nature, or “other” (unclassified).” The last should be used for exposures but has been used for other situations as well. Fires that were coded as under investigation and those that were coded as undetermined after investigation were treated as unknown.

**Factor Contributing to Ignition:** In this field, the code “none” is treated as an unknown and allocated proportionally. For Human Factor Contributing to Ignition, NFPA enters a code for “not reported” when no factors are recorded. “Not reported” is treated as an unknown, but the code “none” is treated as a known code and not allocated. Multiple entries are allowed in both of these fields. Percentages are calculated on the total number of fires, not entries, resulting in sums greater than 100%. Although Factor Contributing to Ignition is only required when the cause of ignition was coded as: 2) unintentional, 3) failure of equipment or heat source; or 4) act of nature, data is often present when not required. Consequently, any fire in which no factor contributing to ignition was entered was treated as unknown.

In some analyses, all entries in the category of mechanical failure, malfunction (factor contributing to ignition 20-29) are combined and shown as one entry, “mechanical failure or malfunction.” This category includes:

- 21. Automatic control failure;
- 22. Manual control failure;
- 23. Leak or break. Includes leaks or breaks from containers or pipes. Excludes operational deficiencies and spill mishaps;
- 25. Worn out;
- 26. Backfire. Excludes fires originating as a result of hot catalytic converters;
- 27. Improper fuel used; Includes the use of gasoline in a kerosene heater and the like; and
- 20. Mechanical failure or malfunction, other.

Entries in “electrical failure, malfunction” (factor contributing to ignition 30-39) may also be combined into one entry, “electrical failure or malfunction.” This category includes:

- 31. Water-caused short circuit arc;
- 32. Short-circuit arc from mechanical damage;
- 33. Short-circuit arc from defective or worn insulation;
- 34. Unspecified short circuit arc;
- 35. Arc from faulty contact or broken connector, including broken power lines and loose connections;
- 36. Arc or spark from operating equipment, switch, or electric fence;
- 37. Fluorescent light ballast; and
- 30. Electrical failure or malfunction, other.

**Heat Source.** In NFIRS 5.0, one grouping of codes encompasses various types of open flames and smoking materials. In the past, these had been two separate groupings. A new code was added to NFIRS 5.0, which is code 60: “Heat from open flame or smoking material, other.” NFPA treats this code as a partial unknown and allocates it proportionally across the codes in the 61-69 range, shown below.

- 61. Cigarette;
- 62. Pipe or cigar;
- 63. Heat from undetermined smoking material;
- 64. Match;
- 65. Lighter: cigarette lighter, cigar lighter;
- 66. Candle;
- 67. Warning or road flare, fuse;
- 68. Backfire from internal combustion engine. Excludes flames and sparks from an exhaust system, (11); and
- 69. Flame/torch used for lighting. Includes gas light and gas-/liquid-fueled lantern.

In addition to the conventional allocation of missing and undetermined fires, NFPA multiplies fires with codes in the 61-69 range by

$$\frac{\text{All fires in range 60-69}}{\text{All fires in range 61-69}}$$

The downside of this approach is that heat sources that are truly a different type of open flame or smoking material are erroneously assigned to other categories. The grouping “smoking materials” includes codes 61-63 (cigarettes, pipes or cigars, and heat from undetermined smoking material, with a proportional share of the code 60s and true unknown data.

**Equipment Involved in Ignition (EII).** NFIRS 5.0 originally defined EII as the piece of equipment that provided the principal heat source to cause ignition if the equipment malfunctioned or was used improperly. In 2006, the definition was modified to “the piece of equipment that provided the principal heat source to cause ignition.” However, much of the data predates the change. Individuals who have already been trained with the older definition may

not change their practices. To compensate, NFPA treats fires in which EII = NNN and heat source is not in the range of 40-99 as an additional unknown.

To allocate unknown data for EII, the known data is multiplied by

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$$\frac{\text{All fires}}{(\text{All fires} - \text{blank} - \text{undetermined} - [\text{fires in which EII} = \text{NNN and heat source} \in 40-99])}$$


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In addition, the partially unclassified codes for broad equipment groupings (i.e., code 100 - heating, ventilation, and air conditioning, other; code 200 - electrical distribution, lighting and power transfer, other; etc.) were allocated proportionally across the individual code choices in their respective broad groupings (heating, ventilation, and air conditioning; electrical distribution, lighting and power transfer, other; etc.). Equipment that is totally unclassified is not allocated further. This approach has the same downside as the allocation of heat source 60 described above. Equipment that is truly different is erroneously assigned to other categories.

In some analyses, various types of equipment are grouped together.

<b>Code Grouping</b>	<b>EII Code</b>	<b>NFIRS definitions</b>
Central heat	132	Furnace or central heating unit
	133	Boiler (power, process or heating)
Fixed or portable space heater	131	Furnace, local heating unit, built-in
	123	Fireplace with insert or stove
	124	Heating stove
	141	Heater, excluding catalytic and oil-filled
	142	Catalytic heater
	143	Oil-filled heater
Fireplace or chimney	120	Fireplace or chimney
	121	Fireplace, masonry
	122	Fireplace, factory-built
	125	Chimney connector or vent connector
	126	Chimney – brick, stone or masonry
	127	Chimney-metal, including stovepipe or flue
Fixed wiring and related equipment	210	Unclassified electrical wiring
	211	Electrical power or utility line
	212	Electrical service supply wires from utility
	213	Electric meter or meter box
	214	Wiring from meter box to circuit breaker
	215	Panel board, switch board or circuit breaker board
	216	Electrical branch circuit

	217	Outlet or receptacle
	218	Wall switch
	219	Ground fault interrupter
Transformers and power supplies	221	Distribution-type transformer
	222	Overcurrent, disconnect equipment
	223	Low-voltage transformer
	224	Generator
	225	Inverter
	226	Uninterrupted power supply (UPS)
	227	Surge protector
	228	Battery charger or rectifier
	229	Battery (all types)
Lamp, bulb or lighting	230	Unclassified lamp or lighting
	231	Lamp-tabletop, floor or desk
	232	Lantern or flashlight
	233	Incandescent lighting fixture
	234	Fluorescent light fixture or ballast
	235	Halogen light fixture or lamp
	236	Sodium or mercury vapor light fixture or lamp
	237	Work or trouble light
	238	Light bulb
	241	Nightlight
	242	Decorative lights – line voltage
	243	Decorative or landscape lighting – low voltage
	244	Sign
Cord or plug	260	Unclassified cord or plug
	261	Power cord or plug, detachable from appliance
	262	Power cord or plug- permanently attached
	263	Extension cord
Torch, burner or soldering iron	331	Welding torch
	332	Cutting torch
	333	Burner, including Bunsen burners
	334	Soldering equipment
Portable cooking or warming equipment	631	Coffee maker or teapot
	632	Food warmer or hot plate
	633	Kettle
	634	Popcorn popper

635	Pressure cooker or canner
636	Slow cooker
637	Toaster, toaster oven, counter-top broiler
638	Waffle iron, griddle
639	Wok, frying pan, skillet
641	Breadmaking machine

Equipment was not analyzed separately for confined fires. Instead, each confined fire incident type was listed with the equipment or as other known equipment.

**Item First Ignited.** In most analyses, mattress and pillows (item first ignited 31) and bedding, blankets, sheets, and comforters (item first ignited 32) are combined and shown as “mattresses and bedding.” In many analyses, wearing apparel not on a person (code 34) and wearing apparel on a person (code 35) are combined and shown as “clothing.” In some analyses, flammable and combustible liquids and gases, piping and filters (item first ignited 60-69) are combined and shown together.

**Area of Origin.** Two areas of origin: bedroom for more than five people (code 21) and bedroom for less than five people (code 22) are combined and shown as simply “bedroom.” Chimney is no longer a valid area of origin code for non-confined fires.

**Rounding and percentages.** The data shown are estimates and generally rounded. An entry of zero may be a true zero or it may mean that the value rounds to zero. Percentages are calculated from unrounded values. It is quite possible to have a percentage entry of up to 100% even if the rounded number entry is zero. The same rounded value may account for a slightly different percentage share. Because percentages are expressed in integers and not carried out to several decimal places, percentages that appear identical may be associated with slightly different values.

## Appendix B.

### NFIRS Coding Changes from 4.1 to 5.0

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Prior to 1999, fire fighters had several choices for coding intentionally set fires. These codes included “incendiary,” “suspicious” “child playing,” and many other fire causes. A fire could be “incendiary or suspicious” or “child playing” (or neither) but not both. There was also an Ignition Factor code to use if mental impairment or drug or alcohol impairment led to misuse of the heat of ignition.

In NFIRS Version 5.0, the data element cause of ignition: intentional, is used to identify intentionally set fires. Now, “intentional” is identified on a different data element from the one used to identify playing, drug or alcohol impairment, or mental impairment. The second data element can accept multiple values as possible reasons for not being able to form legal intent. Also, a fire coded in Version 5.0 can ascribe “playing” as a factor but choose not to ascribe age as a factor (e.g., reckless fireplay by college students) or cite age as a factor for an older child – or even an older adult (e.g., a person with senile dementia whose condition leads to reckless fireplay without intention to harm).

This analysis includes all fires coded as Cause of Ignition: 1-Intentional in Version 5.0 for all years including and after 1999. Any estimates for years prior to 1999 are not for intentional fires, but rather for fires considered incendiary or suspicious.

#### **Trend Analysis and the Disappearance of “Suspicious” as a Cause**

Tables B-1 to B-3 show 1980-1998 statistics for structure, vehicle, and outside and other properties for incendiary and suspicious fires.

It is reasonable to estimate that some fires that would have been coded as suspicious are now being coded as intentional, and the rest are being coded as unknown. The various trend analyses suggest that most are being coded as intentional and that this practice has a more dramatic and visible effect on property damage estimates where the suspicious share of incendiary and suspicious had been growing from 1980 to 1998.

**Table B-1. Trends in Incendiary and Suspicious Structures Fires  
1980-1998**

Year	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Incendiary	Suspicious	Incendiary	Suspicious	Incendiary	Suspicious	Incendiary	Suspicious
1980	113,800	87,300	610	315	1,675	1,335	\$1,025.7	\$750.4
1981	100,600	90,200	515	296	2,180	1,606	\$1,074.1	\$920.3
1982	81,900	77,900	464	465	2,004	1,414	\$1,116.6	\$801.4
1983	69,500	69,300	476	387	1,771	1,387	\$767.3	\$907.4
1984	69,700	66,300	394	267	1,523	1,119	\$827.8	\$721.2
1985	73,100	70,400	430	295	1,582	1,255	\$909.9	\$1,009.9
1986	70,000	70,500	428	371	1,691	1,235	\$903.4	\$882.8
1987	64,800	64,400	408	324	1,503	1,200	\$877.5	\$925.4
1988	62,300	62,700	457	414	1,725	1,414	\$912.8	\$965.2
1989	57,400	59,700	469	374	1,485	1,505	\$732.6	\$851.8
1990	54,400	57,500	422	387	1,514	1,676	\$788.1	\$973.2
1991	56,500	57,500	456	238	1,885	1,510	\$1,030.9	\$1,135.8
1992	60,200	56,400	391	329	1,552	1,616	\$1,790.0	\$800.6
1993	51,900	52,400	464	378	1,776	1,553	\$840.3	\$826.3
1994	51,800	56,100	239	264	1,698	1,376	\$865.2	\$890.9
1995	48,400	50,900	379	360	1,351	1,195	\$820.9	\$1,323.7
1996	48,100	50,700	347	335	1,409	1,238	\$874.3	\$928.2
1997	43,100	41,900	338	320	1,165	929	\$685.5	\$764.3
1998	39,900	46,100	271	367	1,082	1,241	\$638.0	\$829.1

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. These estimates include a proportional share of unknown Ignition Factor. Fires are rounded to the nearest hundred.

Source: Data from NFIRS Version 4.1 (1980-1998) and NFPA survey.



**Table B-2. Trends in Incendiary and Suspicious Vehicle Fires  
1980-1998**

Year	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Incendiary	Suspicious	Incendiary	Suspicious	Incendiary	Suspicious	Incendiary	Suspicious
1980	41,200	33,600	22	13	111	69	\$75.9	\$67.4
1981	34,400	31,100	8	15	114	79	\$65.4	\$64.8
1982	28,000	28,000	26	0	50	45	\$44.8	\$70.6
1983	26,700	28,600	15	177	76	61	\$87.7	\$77.9
1984	29,300	35,200	25	10	71	48	\$77.6	\$98.1
1985	31,200	41,700	21	24	72	69	\$52.4	\$75.3
1986	34,100	44,500	27	16	96	69	\$61.3	\$231.4
1987	33,700	42,800	35	22	87	92	\$80.8	\$104.0
1988	32,800	39,700	24	21	75	64	\$105.5	\$109.4
1989	32,000	38,000	31	23	97	55	\$106.0	\$116.1
1990	35,100	41,100	17	13	109	64	\$119.0	\$123.9
1991	36,300	40,500	26	9	78	51	\$129.2	\$138.7
1992	35,800	37,700	18	12	80	78	\$115.6	\$119.8
1993	31,500	36,700	19	20	50	53	\$108.2	\$98.4
1994	28,700	34,600	29	22	92	67	\$102.7	\$135.2
1995	30,900	35,400	27	40	53	79	\$126.2	\$141.2
1996	35,100	39,300	34	31	42	66	\$128.7	\$133.8
1997	30,600	33,900	25	19	77	46	\$136.9	\$155.9
1998	29,000	37,300	20	15	83	83	\$137.8	\$186.1

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. These estimates include a proportional share of unknown Ignition Factor. Fires are rounded to the nearest hundred.

Source: Data from NFIRS Version 4.1 (1980-1998) and NFPA survey.

**Table B-3. Trends in Incendiary and Suspicious Outside and Other Fires  
1980-1998**

Year	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Incendiary	Suspicious	Incendiary	Suspicious	Incendiary	Suspicious	Incendiary	Suspicious
1980	259,100	324,800	18	0	97	60	\$11.4	\$7.5
1981	223,600	344,600	19	1	103	68	\$12.2	\$19.9
1982	173,600	277,300	13	0	81	45	\$9.5	\$11.2
1983	152,500	228,500	10	0	87	36	\$5.8	\$8.2
1984	149,600	220,900	12	2	99	69	\$6.4	\$6.5
1985	153,400	227,600	17	12	95	47	\$7.9	\$14.3
1986	154,400	219,200	11	0	59	51	\$7.0	\$9.1
1987	163,000	205,800	27	4	77	49	\$5.8	\$8.3
1988	169,600	216,300	9	4	84	56	\$6.6	\$14.3
1989	154,800	177,800	10	3	62	50	\$20.6	\$11.0
1990	162,200	189,200	7	5	66	48	\$24.9	\$12.3
1991	170,100	197,300	13	1	98	77	\$3.9	\$5.4
1992	167,500	187,600	9	1	118	54	\$43.5	\$19.3
1993	166,000	181,200	4	4	108	44	\$6.5	\$6.7
1994	178,100	198,300	3	3	125	95	\$15.0	\$18.4
1995	182,000	186,300	7	2	98	85	\$8.6	\$17.4
1996	177,300	174,200	7	6	84	78	\$8.3	\$20.4
1997	151,700	141,500	7	1	75	42	\$6.8	\$9.1
1998	146,000	148,900	4	3	152	66	\$18.6	\$67.7

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. These estimates include a proportional share of unknown Ignition Factor. Fires are rounded to the nearest hundred.

Source: Data from NFIRS Version 4.1 (1980-1998) and NFPA survey.

## Appendix C.

### Selected Published Incidents

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The following are selected published incidents involving spontaneous combustion. Included are short articles from the “Firewatch” or “Bi-monthly” columns in *NFPA Journal* or its predecessor *Fire Journal* and incidents from either the large-loss fires report or catastrophic fires report. If available, investigation reports or NFPA Alert Bulletins are included and provide detailed information about the fires.

It is important to remember that this is anecdotal information. Anecdotes show what can happen; they are not a source to learn about what typically occurs.

NFPA’s Fire Incident Data Organization (FIDO) identifies significant fires through a clipping service, the Internet and other sources. Additional information is obtained from the fire service and federal and state agencies. FIDO is the source for articles published in the “Firewatch” column of the *NFPA Journal* and many of the articles in this report.

#### **Fire started to cover murder, Kansas**

Firefighters responding to a fire in a 24-unit apartment discovered the body of a woman who had been killed before the fire began.

Two occupants on the second floor of the unsprinklered, three-story, wood-frame building discovered the fire, one person when her carbon monoxide detector woke her and the other when her smoke detector operated, and both called 911. The first alarm was received at 4:54 a.m.

Arriving firefighters found nothing showing outside the building but, after talking to one of the callers, discovered the fire in a neighboring unit.

When they entered the apartment, they saw fire and smoke and began to evacuate occupants from the units on the floor above.

Crews advancing a hose line into the unit of origin noted two fires, one in the living room and one in the bedroom, where they discovered the victim’s body. When they’d extinguished the two fires, they found a gasoline can in the living room and sealed the apartment for investigators.

The investigators determined that the woman had suffered severe head trauma and died before the perpetrator poured a trail of gasoline from the bedroom to the living room and ignited it with a lighter.

Damage to the building, valued at \$500,000, was estimated at \$40,000; damage to its contents was estimated at \$10,000. There were no injuries.

Kenneth J. Tremblay, 2011, “Firewatch,” *NFPA Journal*, January/February, 21-22.

### **Sprinklers control fire in furniture warehouse, Virginia**

Sprinklers controlled a fire in a furniture warehouse until firefighters arrived to extinguish it.

The single-story, steel-frame building, which was 1,500 feet (457 meters) long and 400 feet (122 meters) wide, had masonry walls and a steel-frame roof covered by metal decking topped with foam insulation and a rubber membrane. The building was protected by a wet-pipe sprinkler system with a monitored water flow alarm.

Firefighters received the alarm at 11:59 a.m. and had begun to respond when the warehouse manager canceled the alarm four minutes later. At 12:08 p.m., however, the manager called back to confirm that there was a fire, and firefighters once again responded. Despite the initial cancellation, the volunteers had continued to respond to fire department headquarters, so the cancellation did not cause a delay in response.

When fire crews arrived at the scene, they learned from employees that the fire was in the center of an aisle with stacked boxes of furniture. The employees had tried unsuccessfully to control the blaze using portable extinguishers, but the flames spread from the furniture to the roof, causing four sprinklers to operate and contain the fire. Because of the stacked storage, the seat of the fire was shielded from the sprinklers' discharge. Wearing SCBA, the firefighters used forklifts to remove furniture and extinguished the fire using hose lines.

Investigators suspect that the fire was intentionally set by someone who used an open-flame device to ignite the cardboard boxes.

Manual fire doors were closed during the fire, limiting fire damage to the immediate area. Estimates of property damage were not reported.

Kenneth J. Tremblay, 2011, "Firewatch," *NFPA Journal*, January/February, 27.

### **Sprinkler extinguishes intentional fire in hospital, Florida**

A single sprinkler extinguished a fire that a 58-year-old man set by igniting a paper towel dispenser in a single-occupant restroom at a hospital.

The 10-story hospital was constructed of steel and concrete, and had concrete block walls. The structure was protected by a fire detection system and a wet-pipe sprinkler system.

Firefighters responding to the alarm at 6:10 a.m. arrived 8 minutes later. Security personnel directed them to the second floor, where they found that a sprinkler had already extinguished the blaze.

Security cameras caught the man smoking near the bathroom just before the fire started. Investigators determined that he used his lighter to ignite the paper towels and that the fire spread to the wall-mounted dispenser. The sprinkler extinguished the blaze before it could spread to anything else.

The building and its contents, which were valued at more than \$25 million dollars, sustained \$24,000 in damage. There were no injuries. Police arrested the perpetrator.

Kenneth J. Tremblay, 2011, "Firewatch," *NFPA Journal*, March/April, 30.

### **Sprinklers confine warehouse fire to area of origin, Illinois**

A warehouse that was subdivided into a number of different occupancies was spared significant damage when several sprinklers operated and confined to the area of origin a fire that had been set intentionally.

The single-story, steel-frame warehouse had a metal bar joist roof and steel decking covered by a tar and gravel roof 30 feet (9 meters) above grade. A wet-pipe sprinkler system provided full coverage, but the warehouse's fire and water flow alarms, though operational, were not monitored by a central station company.

The business in which the fire started was closed for the night, but another portion of the building was occupied, and the workers there called 911 at 3:54 a.m. to report that they saw smoke in the structure. Police arrived before the fire department and reported heavy smoke showing from the building, as did the first-in engine company. Advancing a hose line through a door on the side of the building, fire crews tried to establish a water supply using a private hydrant. However, the water pressure was poor.

Five to eight minutes after the first engine arrived, the building's exterior water motor gong sounded as the first sprinkler began operating. Firefighters made a trench cut in the roof to ventilate the warehouse as additional engine companies backed up the first engine, established a water supply, and supported the sprinkler system.

Investigators determined that a person or persons unknown intentionally set the fire in a section of the warehouse that was used by a company that sold palletized plastic bottles shrinkwrapped in plastic to food companies. The fire was started at the base of one pallet and spread to several others before the sprinklers operated and controlled the blaze.

Valued at \$5 million, the warehouse sustained an estimated \$500,000 in property damage. Its contents, valued at \$3 million, sustained an estimated \$1 million in damage. The fire department reported no injuries.

Kenneth J. Tremblay, 2011, "Firewatch", *NFPA Journal*, May/June, 48.

### **Sprinkler extinguishes incendiary school fire, Arizona**

A single sprinkler extinguished an incendiary fire at an occupied school, limiting property damage in the \$4.3 million structure to roughly \$43,000.

The single-story school, built in 2008, was constructed of masonry walls on a concrete slab with a prefabricated wooden truss roof covered by wood decking and a built-up roof surface. The interior partitions of the building were wood-framed. The school's fire alarm system, which included smoke detectors, and its wet-pipe sprinkler system were monitored by an alarm company.

Someone started the fire in the men's bathroom by setting paper towels alight in a large plastic waste barrel. Smoke from the fire tripped the smoke detector and the sprinkler, which extinguished the fire before firefighters responded to the 8 a.m. alarm.

There were no injuries.

Kenneth J. Tremblay, 2011, "Firewatch," *NFPA Journal*, July/August, 19.

### **Sprinkler controls incendiary fire in college classroom, Pennsylvania**

Sprinklers controlled an incendiary fire in a college classroom, and the building's fire alarm system alerted occupants, who safely evacuated. The building was open and classes were in session at the time of the fire.

The three-story, steel-frame building had concrete block walls and a wooden roof with a built-up surface. The building had an automatic detection system, but its type and coverage were not reported. A partial wet-pipe sprinkler system was monitored by a central station alarm company.

An unknown person deliberately ignited paper in a classroom in which teaching supplies were kept. The fire spread through the room until heat activated two sprinklers in the hallway, which confined the fire to the room of origin.

The building, valued at \$5 million, sustained \$100,000 in damage. Its contents, valued at \$1 million, sustained damage estimated at \$50,000. There were no injuries.

Kenneth J. Tremblay, 2010, "Firewatch", *NFPA Journal*, March/April 26.

### **Sprinkler controls incendiary fire in shopping mall, Tennessee**

A single sprinkler operated during an incendiary fire, sparing a multi-million-dollar shopping mall significant damage.

The two-story, steel-frame mall had concrete floors and walls and contained 1.3 million square feet (121,000 square meters) of floor space. It was protected by a wet-pipe sprinkler system and had a fire detection system that provided smoke detection, elevator recall, and occupant notification, as well as a water flow alarm.

A mall employee discovered the fire shortly after it began in a first-floor housekeeping break room. He notified mall security, which met firefighters responding to the 5:30 p.m. water flow alarm and directed them to the site of the blaze.

Investigators determined that the fire began when an unknown individual used a match or a lighter to ignite a plastic bag on a housekeeping cart in the break room, which was located under a wooden mezzanine. The fire consumed the bag and its contents and began to spread to the underside of the mezzanine before it was subdued by a sprinkler.

The fire did approximately \$10,000 in damage to the building, which was valued at \$120,000 million, and its contents, valued at \$60 million. There were no injuries.

Ken Tremblay, 2010, "Firewatch", *NFPA Journal*, May/June, 42.

### **Four dead in apartment building fire, Michigan**

An early morning fire spread from the second floor of a four-story apartment building, trapping and killing a 38-year-old woman and three men, ages 44, 53, and 63.

The unsprinklered building was constructed of heavy timber construction with a brick exterior and a flat roof covered by a rubber membrane. It had only local smoke alarms, which operated as designed, alerting the residents, most of whom were asleep at the time.

The fire began in a second-floor laundry room and spread throughout the building. The 44-year-old man was found on the third floor. The locations of the woman and the other two men were not reported.

The building, valued at \$750,000, and its contents, valued at \$60,000, were destroyed. A resident of the building has been charged with setting the fire and is awaiting trial.

Ken Tremblay, 2010, "Firewatch," *NFPA Journal*, July/August, 30.

### **Two intentional fires in foreclosed home, Arizona**

An intentionally set fire substantially damaged the second floor of a large, single-family house. Although the house, which was under foreclosure, had a fire sprinkler system, it failed to operate because the water had been shut off due to nonpayment.

The two-story wood-frame home, which covered approximately 5,900 square feet (548 square meters), was vacant at the time of the fire. All it contained was some trash and an upholstered couch. Hardwired smoke detectors were located in the common areas and bedrooms, but they had been disabled by lack of electricity.

A neighbor noticed the fire and called 911 at 11:58 p.m. Firefighters arrived minutes later to find heavy smoke and flames coming from the second floor, and extinguished the blaze using a tower ladder and several monitor nozzles.

Investigators found evidence that a door had been forced open before the firefighters arrived. They also determined that an accelerant poured on the second floor and in the first floor hallway had been ignited by an unknown ignition source. The fire consumed some of the remaining contents before it spread through structural floor and ceiling voids to the attic.

The home, valued at \$1 million, incurred \$200,000 in damage.

Two nights later, the house was destroyed by a second fire. By the time firefighters were summoned to the property at 8:05 p.m., flames were visible on both floors of the structure, and they had to use more than 160,000 gallons (606,000 liters) of water to extinguish the blaze.

Investigators found that the lock on the natural gas supply valve had been broken and that valves on the gas line in the laundry room had been opened before an accelerant poured in a first-floor hallway was ignited. The fire spread up the open stairs and vented through the roof, which had been opened during the previous fire.

Ken Tremblay, 2009, "Firewatch," *NFPA Journal*, September/October, 24.

### **Incendiary fire destroys abandoned building, North Carolina**

An intentionally set fire damaged a large abandoned manufacturing building that had been condemned and was slated for demolition. It was being used for storage, and its contents provided the fire's fuel.

The three-story building, which was 300 feet (91 meters) long and 150 feet (46 meters) wide, was constructed of heavy timber with dimensional structural wood framing and brick walls. Its flat roof was covered by tar roofing material. A sprinkler system had been installed, but previous freeze-ups and falling timbers had caused the piping to break, rendering it useless.

A passerby called 911 at 6:26 p.m., and fire companies arriving four minutes later fought the blaze defensively because of the existing structural problems. Investigators determined that someone had ignited plastics and rolls of paper stored on the first floor near the middle of the warehouse.

There were no injuries.

Ken Tremblay, 2009, "Firewatch," *NFPA Journal*, September/October, 27.

### **Intentionally set fire kills two, Louisiana**

A 20-year-old man and an 8-month-old baby boy died of smoke inhalation when they were trapped by an intentionally set fire in their unsprinklered manufactured home. Three other occupants escaped.

The single-story, wood-frame home, which was 16 feet (5 meters) wide and 80 feet (24 meters) long, had a smoke alarm that failed to operate.

Investigators determined that someone intentionally ignited clothing and a mattress in a middle bedroom and that the fire spread out of the room into the hallway. Three of the occupants managed to escape and called 911 from a cell phone, but the man and the baby were in the master bathroom with the door closed. By the time he discovered the fire, it had blocked the door to the hallway; furniture partially blocked a bathroom window. Firefighters found the man lying in the doorway between the bedroom and bathroom and the baby lying up against the tub.

The home, which was valued at \$25,000, and its contents, valued at \$8,000, were destroyed.

Ken Tremblay, 2009, "Firewatch," *NFPA Journal*, November/December, 20.